

A Dravidian decipherment of Indus script

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5 Abstract

The Indus script writing system is described here as a logo-syllabic system with almost unique syllables associated with them. The crucial aspect of the decipherment is the observation that semantic value of numbers are not related to quantifiers but are used as adjectives such as first/strong/mature etc. through the syllables that are derived out of it. The standalone semantic values of the logo have crucial role to play in deciding the syllabic value of the logo, but it only uses the modified syllabic value in the instances of the text. Although main syllabic value is maintained around it's primary consonant value, the syllables have pluripotency both in terms of semantics and syllables in context, i.e., they have modified vowels and soft consonants (glides).

This decipherment is not only about syllabary, it also provides complete semantic decipherment as well, uncovering various aspects of the life of Indus Valley Civilization. Most of the seals are about the barter trade transactions and describe from/to addresses, with mode-of-transport indicated in-between. The urn-symbol is deciphered as "ūr" (town/village) with various adjectives preceding it (or infused into the sign) describing the town. The unicorn-seal indicates that it is trade-related activity. The fish-signs and arrow signs describe the mode of transport of goods. The goods are indicated by the object before the animal indicating whether it is a food-type or not (perishable goods or not). The decipherment also uncovers aspects other than trade, like marriage and disputes.

Prelims

We list a few acronyms/initialisms that is commonly used in the article:

- IVC : Indus Valley Civilization
- 25 DED: Dravidian Etymology Dictionary [1]
- M77: MASI 77, Mahadevan [2]
- WB: Wells, B., Indus Writing [3]
- MVB: M.V.Bhaskar [4]

DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. Here we use M77 to denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. Mahadevan has simplified and reduced the number of signs, by considering many of them as variants of the same theme or treating them as identical. For a richer source of symbols and data, please refer to Wells [3] or the character list in NFM Indus Script font.

Introduction

35 Indus valley civilization was contemporary to other civilizations such as the Mesopotamia and
Egyptian civilizations with it's own independent system of writing. Each of these systems had their
own culture and languages that were unique to their own civilization. It is a great challenge to
decipher any one of them without a multilingual Rosetta stone, but such decipherments have been
40 successfully achieved in the case of Linear Elamite [5]. In the case of Indus script it has been well
established, through various indirect attempts, that it is closely related in cultural aspects with the
ancient Dravidian culture and language. However, broad confusion arises when attempts are made
to relate it to an alphabetic system as it seems similar to a complex logo-syllabic system like the
Egyptian system of writing. There have been many futile attempts to conjure-up such a relation
45 between the Tamil Brahmi writing system and the Indus script, despite of the fact that the Indus
signs have strong pictorial content.

It took a while for the modern alphabets to arrive (around 1000 BCE) and one can expect that the
logo-syllabic system of Indus script, like the earlier versions of Egyptian writing system, to be pre-
alphabetic/abugida stage, where pure consonants have not yet been crystalized and extracted out of
the spoken languages. From this decipherment it seems that the atomic units (signs) of the IVC
50 writing system are logo-syllables, with the high potential for creating homophones, thus reducing
the number of signs required for the orchestration of the writing system within the specific context
of IVC society and it's trade transactions.

In this decipherment, the author followed the trail left by these signs (like a detective), as it
uncovers through internal evidences tracing them one by one. Sometimes serendipity plays a big
55 role in our findings, and all this would not have been possible but for the enormous sign lists and
concordance data that has been gathered painstakingly by many reserachers over very many
decades, making them freely accessible online. Of course, it also helps if your mother tongue has
roots to the very same language and culture, although displaced in time by more than 5000 years!

In the next section we first outline the syllabary of Indus script as it is preceived here. Detailed list
60 of all symbols and their syllabic values are described in a later section on "Syllabic development".
After the next section on orthography we briefly describe the skilled artistry of Indus writing
system, then the crucial role of Numbers, Clitics and the system of "Learning through pun". In the
section after "Syllabic development" we describe a few frequent phrases that emerge out of the
corpus with two or three logos. We then classify a few logos under functional ideographic
65 categories (although they are primarily syllables they also have certain ideographic tendencies).
Next we outline the crucial aspects of fish signs and their various manifestations. In the section after
this we briefly sketch the dominant trade activities and their relative importance and it's
implications in the development of a class society. We then go on to decipher several lines of text in
the corpus and also seals containing interesting graphical content with their corresponding text in a
70 "Show and tell" section. We end the body of the article with sections about "Overlap with previous
work" and "Acknowledgements".

Orthography of the Indus script

The logo-syllabic syllabary of Indus will be described here as it is preceived here in use. We try to discern if there are broad rules of orthography in this writing system that we can observe. We will start with some simple number systems and see how they can prefix or suffix to other symbols/syllables in the system.

To begin with we use a simple rule that there is one and only one syllable to which each of these signs get assigned to. This is a simple rule to follow and it can be easily be discerned if it breaks. We will now describe the other patterns or rules that we observe.

- 80 Let us now consider the M77 sign-373 ○ to which we assign the syllable “pa” (from “pakaḷ”, meaning the sun or daylight). For the sign-86 | we assume that it has the value “mutaḷ” (the primary one) and then see how it applies to the sign-375 ⊙. We believe that this value is indicated by the sign-376 ∅ that has a tooth attached to it. So we have:

pa + mut-aḷ = paḷ

- 85 Now let us consider the sign-391 ⊗, a sign that we know has strong correlations with elephant seals from MVB [4] findings, so we assign the value “paḷḷa” that also has close proximity to “paḷ”, but we can see there are three cross-lines and/or six small pieces, making it more like “pillir”. There is also another possibility that this is decided by DED 1045 ṁṭai/ṁṭa, a metal badge that is applied to the forehead of the elephant. So we observe that although broad rules are applied, there are also *ideosyncracies* of local culture that also provide a few interesting twists and turns, but in general it tries to confirm to some broad outlines.

- 90 We will now move to the interesting sign-287), which we have assigned the value “valai/valai” after looking at it’s close cousins sign-298)))) and sign-290 𑀓 that has five strokes affixed to it’s top-right.

)))) = 𑀓 =) + |||| = vala + ai = valai

Doubling on that we get,

)))) = valai + |||| = valai + ai = valaianjih or valaicci or valayacci

If sign-290 has three strokes on top we can get,

- 100 𑀓 = valai + ||| = valai + mu = valaiyam

Semantically “vala/vala” is “right/curved” as the symbol right parenthesis and when combined with “5” (ai) it becomes valai.

- We also observed for M77 sign-62 (𑀓) that we can assign value “vālai” (scabbard fish that has sharp teeth). The sign-295 𑀓 “iru-valai” sounds similar to “ēri-vālai”. These signs also indicate that such deformation of the base syllable is possible, i.e., “valai” ≈ “vālai” and “ēri” ≈ “iru”. Of course, high homophony is one of the crucial principles in creating a script with minimal number of signs.

Next, we look at sign-81 (𑀓) that we assign the value “valai-puri”, while we assign sign-63 (𑀓𑀔) the value “kanni-pori” (DED 1183, 4538, 4603). This then decides “kanni” for fish-sign and
110 “puri” ≈ “pori” for bird (quail) sign.

Based on these successes we decide to take a look on the other variants of fish-sign. For sign-70 (𑀓𑀔) we apply “kāl” (DED 1483 assigns the semantic value of “cart”) and for sign-72 (𑀓𑀔𑀔) “kōl” (DED 2238 assigns a semantic value of “raft/float”). One might ask why not assign the values the other way around, but the important clue comes from the cross-line that looks more like paddle/oar. Yes,
115 again there are some *ideosyncracies* that comes with it.

We now move to sign-328 (𑀓𑀔𑀔𑀔) for which we assign the value “ū/u/va”. So for the sign-332:

$$𑀓𑀔𑀔𑀔 = 𑀓 + 𑀔𑀔𑀔 = va + ai = vai$$

Similarly we also get the very important sign-342:

$$𑀓𑀔𑀔 = 𑀓 + 𑀔 = ū + iru = ūr$$

120 Next, we get on to double affix, sign-336 (𑀓𑀔𑀔𑀔𑀔):

$$𑀓𑀔𑀔𑀔𑀔 = 𑀓 + 𑀔 + 𑀔𑀔𑀔 = u + mu-ta-l + 𑀔 = uṭaṇ (DED 945)$$

Here sign-374 (𑀔𑀔𑀔) takes the value “ṇ” (from droplet, “nīr”) and sign-336 (𑀓𑀔𑀔𑀔𑀔) has the ideographic association with mortar & pestle (a marriage ritual association as well)! In the M77 concordance list the sign-321 (𑀓𑀔𑀔) is immediately preceded by sign-336 (𑀓𑀔𑀔𑀔𑀔). As the two sign-374 (𑀔𑀔𑀔) are
125 joined together by a string, a value of “ñāṇ” (DED 2908 “string”) will be the correct one:

$$𑀓𑀔𑀔𑀔𑀔𑀔 = uṭaṇ + ñāṇ = uṭaṇ-ñāṇ (marriage agreement)$$

Although the picture speaks thousand words there are also hints of syllables through micro-typography in Indus script. Consider sign-402:

$$𑀓𑀔𑀔𑀔 = 𑀔𑀔𑀔 + 𑀔 = na + ṭu = naṭu$$

130 𑀓𑀔𑀔𑀔𑀔 = 𑀔𑀔𑀔 + 𑀓𑀔𑀔𑀔 = nāl + naṭu = nāṭu

$$𑀓𑀔𑀔𑀔𑀔 = 𑀔 + 𑀔𑀔𑀔 = mutal + ni = maṇi$$

$$𑀓𑀔𑀔𑀔𑀔 = 𑀔𑀔𑀔 + 𑀔 = ni + mutal = aṇiyal$$

and now let us consider another sign-51:

$$𑀓𑀔𑀔𑀔𑀔𑀔 = 𑀔𑀔𑀔 + 𑀔𑀔 + 𑀔𑀔𑀔 = mu + iru + an = māran$$

135 with an additional twist as “māran” twists and looks back (a feature observed by Mahadevan and passed-on through personal communications by MVB).

Of course, we can also say as additional double-emphasis things like:

iruvaṇi-māran-kuṛumpu

(true-path māran chief)

140 Now on to another topic:

| M77 No. | Glyph | Roman | Tamil |
|---------|-------|----------|---------|
| 169 | 𑌵 | nilam | நிலம் |
| 171 | 𑌶 | nilai | நிலை |
| 174 | 𑌷 | iru-nēla | இருநெல் |
| 88 | 𑌸 | nal-iru | நல்-இரு |

These are characters that seems to stand-out (pun intended with “nīl” being DED 3675 “to stand”), i.e., decided more by the context of IVC barter transactions and not by any complex orthography rules.

145 So as a broad outline we can say that the signs in IVC script are strongly associated with unique syllables and that the IVC writing system allows plenty of ways to mutate them in many ways from their base ideographic glyph values. However, it is not clear that in the case when there are multiple affixes applied, then which comes first, i.e., whether a base glyph applies first etc. In general one could assume it flows from right-to-left and top-to-bottom, but I suppose there are many exceptions
150 that are decided by the context.

For example the famous sign-116 𑌶𑌶𑌶𑌶 can take the value “nellai/nallai” but the other-way around can also be “ayaḷ” is quite unlikely in the IVC transaction context. Sign-112 𑌶𑌶𑌶 works as “munnāḷ” but in the semantics of IVC transactions “ñāḷam” works better. Of course, both are possible and even within the context of IVC “munnāḷ” might be a better choice in some particular
155 case.

The non-affixed pure IVC signs have unique syllables associated with them, which have either single consonant and two consonants at the most. The combining rules usually seem to drop the middle consonants, and of course the vowels are modified as pertinent to the situation.

In some cases the components may not be a disjoint merger but a continuous merger (welding) of
160 the two as in this case:

𑌶𑌶 = 𑌶 + 𑌶

taṛi = tan + vaṛi

Finally as an interesting remark I would like to bring to attention a nice little sign-310 𑌶𑌶 with a probable value of “vilaviḷa” (DED 5424)

165 𑌶𑌶 = 𑌶 + 𑌶 = vil + vil = vilaviḷa

that sounds similar to “vavvāḷ” (long-tailed fruit bat?) as used in this line of text:

𑌶 𑌶 𑌶𑌶 𑌶𑌶

Trembling with fear “vilaviḷa” cognates well with “eerie bat”, so we try to decipher this line.

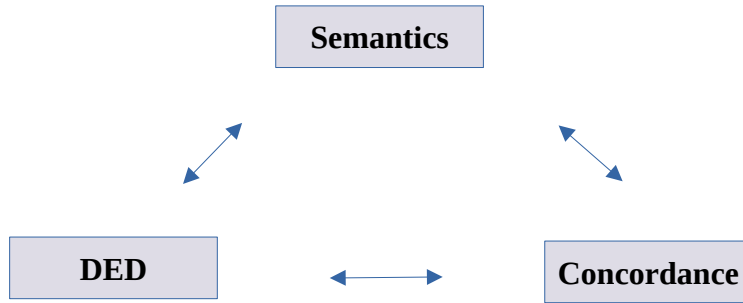
170 Vilamban trembling with fear “loading” (māṭṭu, 𑌶) the bow, but what’s to the right of vilamban, a tiger? Tiger trembling or the hunter trembling? So we notice that it could be:

cīruttai = cīpu + iru-tai = 𑌕𑌃 + 𑌕 (right-to-left) = 𑌕𑌃𑌕

This describes the process of discovery through an example. As a broader generalization we could insist for Dravidian decipherment that the following triangle commute (i.e., more like walking on three legs or squash on three walls):

175

180



We illustrate this with a line of text:

𑌕𑌃𑌕 𑌕𑌃𑌕 𑌕𑌃𑌕 𑌕𑌃𑌕

185 valan.ai-iru.valai-varvan.ūr-anjih

To fit it into the context we need to modify this to:

valamai-iru.vilai-vuṛavan.ūr-anjih

வளமை இருவிளை உழவனார் வஞ்சி

Semantics:

190 Fertile highly productive farmer's town paddy

or

Fertile double-crop farmer's town paddy

We now show how consonants and vowels express themselves in this system, but since it is not an alphabetic system, they don't carry any special importance by themselves as there are many more syllables with single and double consonants that are used to complete the language.

195

Consonants and their signs

| Consonant | M77 sign | Glyph | Roman | Tamil |
|-----------|----------|-------|-------|-------|
| ka (க) | 59 | 𑌕 | kaṇṇi | கண்ணி |
| ce (சே) | 76 | 𑌕𑌃 | cēval | சேவல் |
| ta (த) | 216 | 𑌕𑌃𑌕 | taṇṭi | தண்டி |
| pa (ப) | 373 | 𑌕𑌃𑌕𑌃 | pakal | பகல் |
| pu (பு) | 78 | 𑌕𑌃𑌕𑌃𑌕 | pūr | பூர் |

| Consonant | M77 sign | Glyph | Roman | Tamil |
|-----------|----------|-------|------------|------------|
| pū (பூ) | 54 | 𑀧 | pū | பூ |
| ma (மா) | 242 | 𑀭 | māṭi, māṭu | மாடி, மாடு |
| mē (மே) | 197 | 𑀮 | mēl | மேல் |
| mu (மு) | 86 | 𑀵 | mu | மு, முதல் |
| mū (மூ) | 89 | 𑀶 | mū | மூ, மூனு |
| na (நா) | 374 | 𑀹 | na | நா |
| nā (நா) | 95 | 𑀺 | nāl | நால் |
| r (ர) | 87 | 𑀻 | raṇṭu | ரண்டு |
| va (வ) | 328 | 𑀼 | va | வ |
| ra (ரா) | 400 | 𑀽 | ra | நுழ |
| ru (ரு) | 110 | 𑀾 | ru | ரு |

200 Although vowels and glides can be arbitrarily mutated, modified or introduced in to the system while combining with the base syllable, the vowels are very much required at the beginning of a word. We list a few here.

Vowels and their signs

| Vowel | M77 sign | Glyph | Roman | Tamil |
|---------|----------|-------|-------|------------|
| an (அ) | 1 | 𑀭 | an | -அன் |
| āṭu (ஆ) | 50 | 𑀮 | āṭu | ஆத்து, ஆடு |
| ila (இ) | 323 | 𑀯 | ila | இல |
| ūr (ஊ) | 342 | 𑀰 | ūr | ஊர் |
| eru (ஏ) | 110 | 𑀱 | eru | ஏழு |

Skilled artistry of Indus script

At the core of Indus script lies the mastery of a skilled metallurgist (𑀮). We will illustrate this with these with few examples:

𑀮𑀭𑀮𑀭 = 𑀮𑀭𑀮𑀭 = vēl-aṇi-nuraṇ-ūr = வேல்அணிநுழனூர்



The semantic meaning being the town with tailors, jewellery and hunting professions.

𑀮𑀭 = 𑀮𑀭 = mu-iru-mēl-pēr-ul = முவிரு மேல்பொருள்














In this case the semantic meaning could be the mighty great guardian of the township (elevated to kings and gods at later times).

205 Some important places and townships

This is just indicative of the various kinds of townships and professions, and a deeper quantitative study is required to obtain their relative importance. What is interesting is that the third one in the list is farmer's town, which doesn't count really as a town, but in Dravidian languages, the term "ūr" seems to cover what we call "village" also.

- 210 The symbol for "ūr"  is the most important sign in Indus script and it probably derives from the fact that tilling of land melts ("uruku", DEDR 661) the soil through tilling ("uru"). From our decipherment here, IVC seems to consider the first and foremost guardian of town is the tiller or the farmer. We can envisage every other profession developing around it over time. The other one "nāṭu" (DEDR 3638) with sign  is a region that should be considered structured entity or place in opposition to "kāṭu" (DEDR 1438), the wild forest or jungle. However, "nāṭu" or "ūr" seems to include hunter's town/country and trapper's town/country, which seems to be part of what is generally considered forest or jungle. So one has to be careful as to what constitutes a "ūr" or "nāṭu".

- 220 Here we use M77 to denote Mahadevan's sign numbers [2], but the glyphs in this paper were created using Asko Parbola's NFM Indus Script font. DED refers to the entry numbers in Dravidian Etymology Dictionary [1]. For a richer source of symbols and data, please refer to Wells [3]. Some of these signs here have been identified earlier by other authors, so a proper acknowledgment of these facts will be added later on in a separate section.

| M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|---|------------------|------------|-----------------------------|----------------|
| 402 |  | nāṭu | 3638 | country | நாடு |
| 342 |  | ūr | 752 | town | ஊர் |
| 15 |  | uṛavūr | 688 | working, farming town | உழவூர் |
| 347 |  | vėlūr | - | hunter's town | வேலூர் |
| 358 |  | chevūr | - | bronze worker town | செவ்வூர் |
| 351 |  | vėl-nuṛan-ūr | - | hunter-cloth worker town | வேல்நுழவூர் |
| ? |  | che-palla-ūr | - | bronze-elephant worker town | செவப்பல்லூர் |
| 355 |  | vėl-palla-ūr | - | hunter-elephant worker town | வேல்பல்லூர் |
| 361 |  | che-ko-ūr | - | herder-bronze worker town | செங்கோவூர் |
| 372 |  | vėl-aṇi-nuṛan-ūr | - | hunter-jeweller-tailor town | வேல்அணிநுழவூர் |
| 176 |  | aṇcal, anjīh | 54, 56 | resting place | அஞ்சல், அஞ்சி |
| 254 |  | paṭṭi | 3848, 3850 | place | பட்டி |
| 245 |  | taṭṭi | 3036 | place | தட்டி |

| | | | | | |
|-----|----|----------|------|---------------|---------|
| 137 | 𑌕 | cēri | 2007 | assembly | சேரி |
| 190 | 𑌕𑌕 | pālaiyam | 4117 | tribal hamlet | பாளையம் |

225 Numbers

Numbers are treated separately, but they are just like other glyphs, easily welded and affixed to other glyphs, producing a plethora of possibilities. However, they are an important pointer to the fact that the actual standalone semantic value (in this case the numeric number) of the glyphs may have very little to do with it's semantic value.

| M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|--------------------------------------|-------|----------------------|----------|--------------------------------------|-------------------------------|
| 86 | | mutal, -al | 4950 | one, primary | முதல், -ல் |
| 87 | | -ar, -ir, iru- | 474, 481 | big, great, eminent, two | ரண்டு, -இர், -ர், இரு- |
| 89 | | mū-, mūn- | 5052 | mature, three | மூ-, மூன்- |
| 95 | | nal-, -nāl, nalla- | 2912 | good, four | நல்-, -நால், நல்ல- |
| 96 | | -ai | 2826 | unite, five | -ஐ |
| 108 | | aru-, -ar | 2485 | river, fort, six | ஆறு, அறு |
| 110 | | eru-, -eru | 910 | rise, fertile, seven | ஏழு, -எழு |
| Application of above phonemes | | | | | |
| 112 | | nalām, ñālam, munnāl | 2913 | land, healthy, before | நலம், நாலம், முன்னால் |
| 116 | | nallai, nellai | - | rice | நல்லை, நெல்லை |
| 121 | | nal.nel.āl | - | good rice person | நல்நெல்லான் |
| 120 | | mū-munamum | - | three generations back | மும்முன்னோனும், மும்முன்னமும் |
| 119 | | mū-munnor | - | two generations back | மும்முன்னோர் |
| 107 | | mūri, mūrā | 5041 | bullock, buffalo | மூரி, மூரா |
| 93 | | mutalvar | 4950 | chief | முதல்வர் |
| 94 | | iral, irāl | - | - | -இரல், -இராள் |
| 177 | 𑌕𑌕 | nal-mutal, nalāl | - | good chief, good worker, hard worker | நல்முதல், நல்லான் |

230 Clitics

Clitics provide sentence structure (the subject and the object). The default reading order is right to left, but before the clitic 𑌪 (sign 99), the reading is supposed to be left to right (but this doesn't seem to be followed strictly by writers of IVC script).

| M77 No. | Glyph | Syllable | Tamil |
|---------|-------|--------------------|------------------------------|
| 97 | 𑌪 | -il, -da, -ta, -in | -ட, -டு, -த, -து, -இல், -இன் |
| 99 | 𑌫 | -ra, -ru | -ர, -ரு, -ற, -று |
| 123 | 𑌬 | -yar, -yin | -யர், -யார் |
| 344 | 𑌭 | ūr-ār | ஊரார் |
| 343 | 𑌮 | ūr-il | ஊரில் |

- 235 The Indus writing is not without it's own inaccuracies, either by themselves or captured by mistake by the scribes. We noticed a few cases where the clitic sign-99 𑌫 has been captured as sign-87 𑌪, which in those particular instances seem more like a case of sign-99 rather than sign-87. However, it must be mentioned that there are very few mistakes in the Mahadevan's corpus (both in intent and purpose), which has done a nice balancing act between variety and simplicity, thus making it easier for decipherment. For a slightly different opinion from Mahadevan on the list of signs is Wells [3].
- 240 We follow Mahadevan's sign list and numbers here, but it must be possible to do it using Wells [3] list of signs and sign-number as well without any loss of generality.

Learn through pun

- 245 Following are an indication of the pun that abounds in Indus script, which is termed as the "rebus principle". Of course, it only makes sense if your language is close to ancient Dravidian. For deeper understanding you may have to refer to some of the sign values below this in the section on "Syllabic development". We only sketch a few, but the Indus script syllabary abounds in such pun. The reduction of number of glyphs required for a writing system for Dravidian language is very much dependent on prudently choosing glyphs that provide highest possible homophony.

| M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|--|-----------------|------------|------------------------------------|-------------------|
| 298 | 𑌪𑌪𑌪𑌪 | valai = vala+ai | 5267, 5288 |) = vala+5 | வல+ஐ=வலை |
| | Right-parenthesis is "vala" (curved as well as right) in Tamil and "vala" + "ai" = "valai". "vala" is curve, as well as "right", which fits well with description of right parenthesis. Also, 𑌪𑌪𑌪𑌪 can be further expanded as "valaicci" or "valayacci" or "valayanjih". | | | | |
| 62 | 𑌪𑌪 | valai-kanni | 5379 | scabbard fish with fang-like teeth | வாளை கன்னி (மீன்) |
| | The fish "vālai" is known as the scabbard fish that has sharp teeth. A nice tooth is drawn at the top to elucidate the learning. This explains that the right-parenthesis sign-287 carry the phonetic value "valai" | | | | |

| M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|--|------------------|------------|---|-----------------|
| 295 | 𑌪𑌫 | eri-valai | 902 | Another sharp tooth fish | ஏரி வாளை (மீன்) |
| | A fresh water shark, Wallago attu , also known “eri-valai”, a pun again on the word with rebus equation: “vālai” ≈ “valai”. The prefix “eri” comes from “two” or “iru”, leading to one more rebus equation: “iru” ≈ “eri”. | | | | |
| 63 | 𑌪𑌫𑌪 | kanni-pori-valai | - | Trapping of birds | கன்னி-பொறி-வலை |
| | This learning tablet defines the phonetic value of fish as “kanni” and the bird as “puri” by defining it through a polysyllabic pun as “kanni-pori” with a parenthetic “valai” . The “kanni-pori” in Tamil is “trapping”. | | | | |
| 64 | 𑌪𑌫𑌪𑌫 | valai-kanni | - | The clitic reverses reading order | கன்னி-பொறி-வலை |
| | The clitic sign 64 reverses the reading order to the right of it. This learning script defines that. | | | | |
| 376 | 𑌪𑌫𑌪𑌫𑌪 | pal | - | teeth | பல்லு |
| | A teeth is indicated by the protruding teeth effect, just like in the fish teeth. | | | | |
| 57 | 𑌪𑌫𑌪𑌫𑌪𑌫 | irumpu | 486 | iron | இரும்பு |
| | Now we have triple pun: iru-pu (two insects) ≈ erumpu (ant) ≈ irumpu (iron) | | | | |
| 181 | 𑌪𑌫𑌪𑌫𑌪𑌫𑌪 | kottu | 2065, 2064 | pour (sting) | கொட்டு |
| | We can see pincler claws are indicated to show “sting” and “pour” are homophones in Dravidian “kottu”. The stinging honey-bee also is supposed elucidate connotations of “honey” that pours (kottu) from the beehive. | | | | |
| 310 | 𑌪𑌫𑌪𑌫𑌪𑌫𑌪𑌫 | vila-vila | 5424 | tremble with fear | விலவில |
| | This cognates with “vavvāl” (DED 5370), probably a long-tailed fruit bat, with an eerie shivering scene that it creates. | | | | |
| 303 | 𑌪𑌫𑌪𑌫𑌪𑌫𑌪𑌫𑌪 | iṭa | 432 | cleft, gap, split, crack open , slit, breach, chasm | இட |
| | Also works as “iṭaveli” ≈ “iṭai-valai”. | | | | |

250 Signs and affixes

Just to give a flavor of the decipherment here we group few signs under base/affix geometry. In some cases there could be more than one affix. For more details see next section “Syllabic development”.

Sign Om

| Affix Base | | | | | | ॐ | ॐ | ॐ | ॐ | ॐ | - |
|---------------|-----|------|-------|--------------|-------|-----------|------|---------|-------|--------|------------|
| ○ | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | ⑩ | ⑪ |
| pa | pal | para | pammu | nal- para | pallā | vel-appa | pān | cirappu | pānal | pān-an | nal-pallar |
| பா | பல் | பற | பம்மு | நல்பற | பல்லா | வெல்-ப்பா | பாண் | சிறப்பு | பானல் | பானன் | நல்பல்லர் |

255 Sign U

| Affix Base | | | | | ॐ | ॐ | ॐ | - | ॐ ॐ ॐ |
|---------------|-----|----|----|-----|------|------|--------|----------|------------------|
| U | U | U | U | U | U | U | U | U | U |
| ū | val | ūr | ūm | vai | uṭaṇ | uṭai | velūr | chevūr | vel-aṇi-nuraṇ-ūr |
| உ | வ | உ | உ | வை | உடன் | உடை | வேலூர் | செவ்வூர் | வேலணிநுழைநூர் |

Sign ✕

| Affix Base | | ◯ | | | ◁ | | ◊ | - | ✕ |
|---------------|-----|-----|-----|--------|----------|----------|------|------|-----|
| ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ | ✕ |
| ta | taḷ | tan | tai | irutai | ciruttai | mumutai | tāri | toṭu | tan |
| த | தள் | தன் | தை | இருதை | சிறுத்தை | மும்முதை | தாழி | தொடு | தன் |

Sign ✧

| Affix Base | | | ^ | ^ | | |
|---------------|------|------|-------------|------------|------------------|-------|
| ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ |
| kanni | kāl | kōl | peru-kanni | peru-kaṇai | kōnda, gōnde | kanāl |
| கன்னி | கால் | கோல் | பெருங்கன்னி | பெருங்கணை | கொண்ட, கோண்டே | காணல் |


Sign ✠

| Affix Base | | | - | ✠ | - | ^ | | - |
|---------------|-----|--------|---------|----------|--------|-------|----------|--------------|
| ✠ | ✠ | ✠✠ | ✠ | ✠ | ✠ | ✠ | ✠ | ✠ |
| an | āl | aṇṇan | kāvalan | naṭtan | uṇavan | kīrān | mutalvan | nal-mutalvan |
| அன் | ஆள் | அண்ணன் | காவலன் | நாட்டான் | உழவன் | கீழன் | முதல்வன் | நல்முதல்வன் |


260 Sign ✧

| Affix Base | ✧ | | | ✧ | ☐ | ⊕ | ◊ |
|---------------|------------------|--------|---------|--------------------|------------|------------------|------------|
| ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ |
| kō | kōṭṭa, kōṭu | kōṭai | kōṭṭam | nāl-vaṇi- kōṭai | nērcira-kō | pallar-kōṭṭa | kōṭai-vaṇi |
| கோ | கோட்ட, கோட்டு | கோட்டை | கோட்டம் | நல்வழி- கோட்டை | நேர்சிற-கோ | பல்லர் கோட்டை | கோட்டை வழி |

Sign)

| Affix Base | 180° | ○ | ○ 180° | - 180° | 90° | 270° | |
|---------------|------|----------|---------|--------|---|------|-----------|
|) | (|) | (|)(|  | U |)) |
| valai | iṭai | valaiyan | iṭaiyan | iṭa | kuṭa, kuṭai | ū | iru-valai |
| வலை | இடை | வலையன் | இடையன் | இட | குடை | ஊ | இருவிளை |

Sign ○

| Affix Base | | | | | | | ○ ○ | | ≡ |
|---------------|---|-----------------|------|------|------------------|-----------------|-------|-----------|---------|
| ○ |  | ṭ | ṭ | 8 | 8 | 8 | ✂ | 18 | 8 |
| -n | nāṭu | aṇiyal, maṇi | ñāṇ | nan | nannu, nannan | nalnelāl | nuṇan | nan-mutal | nāṇkuṇu |
| ன் | நாடு | அணியல், மணி | நாண் | -னன் | நன்னு, நன்னன் | நல்நெல் லாள் | நுழன் | நன்முதல் | நன்குழு |

Aglutinative logo-graphic structures in Indus script and proof of decipherment

265

One the simplest assumptions one can enforce in a script is to associate a unique syllable to each sign. The next easy assumption to make is to consider complex signs through an agglutination of simple base signs. In a society that makes brick & mortar constructions and tinkering of bronze structures, such a process is natural.

270

There are atleast 417 signs in the Indus script as described in M77 [1]. In this work we shall construct a morphological approach to these ideograms to show how a substantial portion of the signs can be constructed through agglutination of the base signs.

275

Proof of decipherment is the application of Occam's razor, according to which the most appropriate theory is the one that fits the data with the least underlying principles and core signs. More than this principle, the proof of decipherment is in the pudding, i.e., it should lead to a meaningful semantic reading of the lines without any failure (almost say 95% success, a R.A.Fisher significance value). We shall provide such a proof of decipherment after introducing the signs and their syllabic values.

Base signs

| M77 Base | M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|----------|-------|--------------------|--------------------|------------------------------------|--------------------------------|
| 1a | 86 | | mutal, -al | 4950 | one, primary | முதல், -ல் |
| 1b | 237 | □ | mutal | 4951 | base, foot, stump | முதல் |
| 1c | ? | / | vāl | 5376 | sword, sharp | வாள் |
| 1d | ? | \ | cuṭṭi | 2656 | crest, tuff, smart | சுட்டி |
| 1e | 86-87 | , ʸ | nil | 3675 | stand | நில் |
| 2a | 87 | | -ar, -ir, iru- | 474, 481 | big, great, eminent, two | ரண்டு, -இர், -ர், இரு- |
| 2b | 124 | ∧ | ēr | 2815 | plough | ஏர் |
| 2c | 125 | ∕ | eru | 863 | full, strong | எறு |
| 2d | 126 | ∧ | cēr | 2814 | join, unite, mingle | சேர் |
| 2e | 161 | ʸ | vilaku | 5423 | diverge | விலகு |
| 2f | 365 | ∨ | virī | 5411 | spread, expand, blossom | விரி |
| 2g | 137 | ⌘ | cēri | 2007 | village street, assemblage, hamlet | சேரி |
| 3a | 89 | | mū-, mūn- | 5052 | mature, three | மூ-, மூன்- |
| 3b | 233 | ⌘ | mūmalai | 5052 | three mountain range | மும்மலை |
| 3c | 230 | ⌘ | mumalai | 5052 | three mountain range | மும்மலை |
| 4 | 95 | | nal-, -nāl, nalla- | 2912 | good, four | நல்-, -நால், நல்ல- |
| 5 | 96 | | -ai | 2826 | unite, five | -ஐ |
| 6 | 108 | | aru-, -ar | 2485 | river, fort, six | ஆறு, அறு |
| 7 | 110 | | eru-, -eru | 910 | rise, fertile, seven | ஏழு, -எழு |
| 8a | 1 | ⤵ | an | 131, 132 | person | அன் |
| 8b | 12 | ⤵ | uṛavan | 688 | farmer | உழவன் |
| 9 | 162 | ʸ | vēl, vėl | 5545, 5536 | chief, spear, trident | வேல் |
| 10 | 374 | ○ | -n | 1159b, 3621, 3621a | night, bug | நீர் (துளி), (ப)னி, நள், நல்லு |
| 11a | 299 | (| ida, idai | 449 | hip, left | இட-, இடை |
| 11b | 287 |) | vala-, vaḷai | 5313, 5314, | bent, trap, right, net | வல, வள, வலை, வளை |

| M77 Base | M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|----------|----------------|-----------------------------|---|---|-------------------------|
| | | | | 5288 | | |
| 11c | 304 | ᵛ | vil, viḷ | 5422, 5421, 5432, 5433 | bow, call out, sell | வில் |
| 11d | 311 | ᵛ̄ | yār, erīl | 5156 | harp, music, beauty | யாழ், இசை, எழில், |
| 11e | 296 | ᵛ̄i | vaṛi | 5297 | way | வழி |
| 11f | 149 | ᵛ̄̄ | nālvaṛi | 5297 | cross-road | நால்வழி |
| 12 | 312 | ᵛ̄̄i | kuṭi, kuṭai | 1655, 1660 | house, family, lineage, hollow, cavity, penetrate | குடி, குடை |
| 13 | 328 | ᵛ̄̄̄ | u, ū, va | 651, 761 | ooze, mortar | ஊ, உ, வ |
| 14 | 373 | ᵛ̄̄̄̄ | pa | 3805, 4016, 4124, 3884 | sun, pot | பகல், பள்ளம், பானை, பண் |
| 15 | 186 | ᵛ̄̄̄̄̄ | kūrū, kuru | 1924, 1921, 1782 | section/division/ share, to proclaim, brilliant | கூறு |
| 16 | 254 | ᵛ̄̄̄̄̄̄ | paṭi, paṭṭi | 3848, 3850, 3868 | hamlet, village, settlement, rest, roost, step gradee, rank | படி, பட்டி |
| 17 | 216 | ᵛ̄̄̄̄̄̄̄ | ta (tandi, tondi, tavalai) | 2946, 3110, 3549 | earthen pot | தண்டி, தோண்டி, தவளை |
| 18 | 59 | ᵛ̄̄̄̄̄̄̄̄ | kaṇ, kanni | 1159a, 1166, 1168, 1417, 1483 | eye, bamboo raft, trap, trapper | கண், கன்னி |
| 19 | 78 | ᵛ̄̄̄̄̄̄̄̄̄ | pori, puri, purā, purā, pūr | 4286, 4334, 4374, 4603 | courage, pride, chicken, pigeon, dove, quail, pheasant | புரி, பொரி, புறா, |
| 20 | 319 | ᵛ̄̄̄̄̄̄̄̄̄̄ | muri, muṛi | 4977, 5010, 5008 | twist, twine, tender leaf, shoot, sprout, break, perish | முரி, முறி |
| 21 | 132 | ᵛ̄̄̄̄̄̄̄̄̄̄̄ | ala, alai | 240 | wave, commotion | அல, அலை |
| 22a | 134 | ᵛ̄̄̄̄̄̄̄̄̄̄̄̄ | peru, pēr | 4411 | big, large | பெரு, பேர்- |
| 22b | 204 | ᵛ̄̄̄̄̄̄̄̄̄̄̄̄̄ | meruku, mēruve | 5074, | shining, pyramid | மெருகு, மேரு |

| M77 Base | M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|----------|-------|--|--------------------|--|----------------------------------|
| | | | | 5094 | | |
| 22c | 205 | 𑌕 | nal-kompu, nāmpu | 2115, 3649 | good clever, sprout of millet | நால்கொம்பு, நாம்பு |
| 22d | 261 | 𑌖 | kō | 2177, 2178 | mountain, gentry | கோ, கோட்டை |
| 22e | 201 | 𑌗 | vāyil, vāyal, vācal | 5354 | doorway, entrance | வாயில், வாசல் |
| 22f | 244 | 𑌘 | aru, ārru, arai, araṇ | 317, 407, 322, 201 | strong, dwellment, camp, room, castle | அறு, ஆறு, அறை, அரண் |
| 22g | 242 | 𑌙 | māṭi, māḷikai, māṭam | 4796a | mansion, terrace, hall | மாடி, மாளிகை, மாடம் |
| 22h | 197 | 𑌚 | mē, mēṭu, mettai | 5086, 5058, 5069 | top, terrace | மேல், மெத்தை |
| 22i | 202 | 𑌛 | mēṭṭu, mēḍu, metta | 5058, 5069 | height, eminence, hillock, upper storey, storied house | மேட்டு, மேடு, மெத்த |
| 23 | 245 | 𑌜 | taṭṭi, taṭṭu, taṭṭān | 3036, 3039 | cloth, wooden frame, hammer, tap | தட்டி, தட்டு, தட்டான் |
| 24 | 155 | 𑌝 | ampi | 177 | boat, raft, ship | அம்பி |
| 25 | 211 | 𑌞 | anuppu (ampu), anpu | 329 (178), 330 | send, love | அனுப்பு, அன்பு |
| 26 | 83 | 𑌟 | iṛakkam, iṛappu, iṛakkam, iṛappu | 501, 514 | death | இழக்கம், இழப்பு, இறக்கம், இறப்பு |
| 27a | 50 | 𑌠 | āṭu | 347, 5152 | dynamic, enjoy, play, dance, goat | ஆடு |
| 27b | 184 | 𑌡 | ampalam | 173 | village assembly | அம்பலம் |
| 28 | 47 | 𑌢 | araṇ, araṇa, araṇai | 201, 203, 204 | fortress, gift, squink | அரண், அரணை, அரணை |
| 29a | 49 | 𑌣 | kuṛumpu, kuḷampu | 1844, 1829 | chieftain (kuṛumba tribe) | குறும்பு, குளம்பு |
| 29b | 51 | 𑌤 | māru, mārru, mārrī, māran, iruvaṇi-māran-kuṛumpu | 4834 | barter, strong leader | மாறன், இருவழி-மாறன்-குறும்பன் |
| 29c | 302 | 𑌥 | mārral, māru-koḷ | 4834 | exchange | மாற்றல், மாறுகொள் |
| 29d | 129 | 𑌦 | koḷ | 2151 | seize, acquire | கொள் |
| 30 | 127 | 𑌧 | alaku, alanku, aragu | 239, 240, 246, 255 | beak, beauty, grains of paddy | அலகு, அழகு |
| 30 | 180 | 𑌨 | koṭṭu, koṭṭam | 2063, 2064, | pour, sting | கொட்டு (தேன்), கொட்டம் |

| M77 Base | M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|----------|-------|----------------------------|------------|--|-------------------------------|
| | | | | 2066 | | |
| 31 | 249 | 𑌕 | māṭṭu | 4801, 4802 | fasten, put in, fasten, hook, kindle, fire | மாட்டு |
| 32 | 325 | 𑌖 | ila | 497 | leaf | இல |
| 33 | 54 | 𑌗 | pu | 4345 | flower, insect, flourish, bloom, create | பூ (பூச்சி) |
| 34 | 240 | 𑌘 | cil | 1577 | small | சில் |
| 35 | 257 | 𑌙 | cutti, cuttiyal | 2668 | small hammer | சுத்தி, சுத்தியல் |
| 36 | 192 | 𑌚 | paḷli | 4018 | hamlet, herdsman's village | பள்ளி |
| 37a | 190 | 𑌛 | toṭṭi, pālaiyam | 3485, 4117 | fence, army camp, village surrounded by hillocks | பாளையம் |
| 37b | 189 | 𑌜 | toṭṭi, tōṭṭi, ṭōṭal, ṭōṭnā | 3485, 3547 | fence, rake | தொட்டி, தோட்டி, தோடல், தோர்னா |
| 38a | 76 | 𑌝 | cē, cēval | 1931, 2818 | red, bronze, cock | சே, செம்மை, சேவல், |
| 38b | ? | 𑌞 | cē, cēviyan | 1977 | red, ear, red-eared hare | சே, செவி, செவியன் |

Syllabic development

280 We outline from top to bottom how the syllabary is slowly developed from simple to complex glyphs. Happy journey!

| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|-------|---------------|--------------|------------|---|-------------|
| 1 | 𑌐 | B8a | an | 131, 132 | person | அன் |
| | 𑌑 | B8a+B8a | an(n)-an | 131, 132 | brother | அண்ணன் |
| 2 | 𑌒 | B1+B8a+B1 | kāvalan | 1417, 1416 | security guard | காவலன் |
| 25 | 𑌓 | B8a.B1 | mutalvan | 4950 | chief | முதல்வன் |
| 26 | 𑌔 | B4.B1a.B8a | nal-mutalvan | - | good chief | நல்முதல்வன் |
| 3 | 𑌕 | B8a.B1a | aṇṇal, āḷ | 110, 399 | great man, servant, slave, soldier, messenger | அண்ணல், ஆள் |

| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|-------|---------------------------|-------------------------------------|------------------|---|------------------------------------|
| 4 | 𐤀 | (B10.B1a).B8a | nāṭṭān | 3638 | country man | நாட்டான் |
| 5 | 𐤁 | (B10.B1a.B2).B8a | nāṭṭu-ar-an | 3638 | country rules | நாட்டாரன் |
| 6 | 𐤂 | B1c.B8a | cuṭṭi-aṇ | 2656, 2655 | intelligent person | சுட்டியன் |
| 7 | 𐤃 | B1c.B8a | valiaṇ, vallavaṇ, vallāṇ, vallāḷaṇ | 5276 | strong, skilled man | வலியன், வல்லவன், வல்லான், வல்லாளன் |
| 18 | 𐤄 | B1*.B8a | valiyaṇ, vallavaṇ, vallāṇ, vallāḷaṇ | 5276 | strong, skilled man | வலியன், வல்லவன், வல்லான், வல்லாளன் |
| 162 | 𐤅 | B9 | vēl, vėl | 5545, 5536 | chief, spear, trident | வேல் |
| 8 | 𐤆 | B9.B8a | vēlan, vēṭan | 5545, 5368, 5527 | chief, lance fighter, hunter | வேலன், வேடன் |
| 21 | 𐤇 | B9.B8a | vēlan, vēṭan | 5545, 5368, 5527 | chief, lance fighter, hunter | வேலன், வேடன் |
| 176 | 𐤈 | B5.B1a | vanjī, anjih, añcal | 5265, 56, 54 | paddy, rice, to take on shoulder, resting place | வஞ்சி, அஞ்சி, அஞ்சல் |
| 19 | 𐤉 | (B5.B1a).B8a | vanjiyan | 56, 54 | skilled worker | வஞ்சியன் |
| 20 | 𐤊 | (B5.B1a).(B8a.B1a) | vanjiyāl | 56, 54 | helper, social worker | வஞ்சியான் |
| 21 | 𐤋 | B9.B8a | vēlan, vēṭan | 5545, 5368, 5527 | chief, lance fighter, hunter | வேலன், வேடன் |
| 22 | 𐤌 | B3.B8a | munnavan | 5020 | the first one | முன்னவன் |
| 23 | 𐤍 | (B3.B1).B8a | mutalvan | 4950 | chief | முதல்வன் |
| 24 | 𐤎 | (B3.B1) ² .B8a | mutal-mutalvan | 4950 | first chief | முதல்-முதல்வன் |
| 38 | 𐤏 | (B5.B1a).B8a | vanjiyan | 56, 54 | skilled worker, dancer/entertainer? | வஞ்சியன் |
| 9 | 𐤐 | B11b.(B9.B8a) | valai-vēlan, valaiyan | 5288 | animal trapper | வலையன் |
| 12 | 𐤑 | B8b | uṛavan | 688 | farmer | உழவன் |
| 13 | 𐤒 | B8b.B1a | uṛavāl | 688 | farm worker | உழவான் |
| 14 | 𐤓 | B22a.B8b | pēr-uṛavan | 688 | big farmer | பேர் உழவன் |
| 15 | 𐤔 | B8b.(B14.B2) | uṛavūr | 688 | working, | உழவூர் |

| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|-------|------------------------------|------------------------------------|--------------------|--|--------------------------------|
| | | | | | farming town | |
| 35 | 𑌵 | B8b.(B14.B2) | valaiyan | 5288 | trapper, fisherman | வலையன் |
| 37 | 𑌶 | B11a*.B8a | valaiyan | 5288 | trapper, fisherman | வலையன் |
| 39 | 𑌷 | B1c.B8a | aṇṇal | 110 | great man, chief | அண்ணல் |
| 41 | 𑌸 | B22a*.B8a | kīrān, ciṛuvaṇ | 1621, 1594 | poor, boy | கீழான், சிறுவன் |
| 42 | 𑌹 | (B15.(B1) ²).B8a | pallan | 3986a | mahout | பல்ல(வ)ன் |
| 43 | 𑌺 | B8a.B1b | aṭiyavaṇ, aṭiyāṇ, aṭiyōṇ, mutalvan | 72, 4951 | slave, chief | அடியன், முதல்வன் |
| 54 | 𑌻 | B33 | pu | 4345 | flower, insect, flourish, bloom, create | பூ (பூச்சி) |
| 55 | 𑌼 | B33.B1a | pol | 4550 | flowering, flourishing, blooming, creating | பொலி, பொலிவு |
| 374 | 𑌽 | B10 | -n | 1159b, 3621, 3621a | night, bug | நீர் (துளி), (ப)னி, நள், நல்லு |
| 410 | 𑌾 | B10.B10 | ñāṇ, nān | 2908, 3639 | string, me | நாண், நான் |
| 415 | 𑌿 | (B10) ³ | nānnan | 2908, 3639 | twiner | நாணன் |
| 417 | 𑍀 | (B10.B1a) ³ | nalnelāl | - | good farmer | நல்நெல்லாளர் |
| 412 | 𑍁 | (B10) ² .B16 | nāṇkuṛu | 2906 | earthworm | நாண்குழு |
| 186 | 𑍂 | B15 | kūru, kuru | 1924, 1921, 1782 | section/ division/ share, to proclaim, brilliant | கூறு |
| 299 | (| B11a | ida, idai | 449 | hip, left | இட-, இடை |
| 301 | (| B11a.B10 | idayan | 450 | herder, herdsman | இடையன் |
| 287 |) | B11b | vala-, vaḷai | 5313, 5314, 5288 | bent, trap, right, net | வல, வள, வலை, வளை |
| 288 |) | B11b.B1* | valacal | 5278 | emigration, flight | வலச்சல் |
| 298 |)))) | B11b+B5 | valaicci, valaiyacci | 5288 | surround, trap, hunter | வளைச்சி, வலையச்சி |
| 293 |) | B11b+B10 | valaiyan | 5288 | animal trapper (short form) | வலை வேலன், வலையன் |
| 303 |)(| B11b+B11a | iṭa, iṭavai | 432, 434 | narrow way | இட-, இடவை |

| M77 Sign | Glyph | Aglutination | Syllable | DED | Description | Tamil |
|----------|-------|--------------------|--------------------|----------------|---|--------------------|
| 187 | | (B11a+B1).B15 | kutai-kuru | 1714 | notch at end of bow | குதைகூரு |
| 312 | | B12 | kuṭi, kuṭai | 1655, 1660 | house, family, lineage, hollow, cavity, penetrate | குடி, குடை |
| 313 | | (B12) ² | kuṭir | 1655 | house, family | குடிர் |
| 314 | | (B12) ³ | kuṭima | 1655 | house, family | குடிம |
| 315 | | (B12) ⁷ | kuṭi-ēru | 1655 | immigration | குடிஏறு |
| 316 | | B15*.B13 | kurhu-kuṭi | 1785-1655 | deer/ antelope-shelter | குர்ரு-குடி |
| 317 | | (B3.B2).B12 | mūri-kuṭi | 5041-1655 | buffalo-shelter, barn | முரி-குடி |
| 318 | | B11f.B22a .B12 | nāl-vaṛi-peru-kuṭi | 1655 | cross-way-big-shelter | நால்வழி-பெருங்குடி |
| 395 | | B3.(B12.B4) | mu-kūṭal | 1882 | three-way-river-join | முக்கூடல் |
| 328 | | B13 | vu | 651, 761 | ooze, mortar | வ, உ, ஊ |
| ? | | B13.B1 | vala, vala | 5304 | strong, fertile | வல-, வள- |
| 32 | | B13.B8a | uvan | | person between two | உவன் |
| 330 | | B13.B3 | mū-ū(r) | - | triple-town | முஆ |
| 338 | | B13.B3 | mū-ū(r) | - | triple-town | முஆ |
| 339 | | B22h.(B13.B3) | mēl-mū-ū(r) | - | up triple-town | மேல் முஆ |
| 332 | | B13.B5 | vai | 5549-53 | to stay, straw of paddy, to abuse, sharp | வை |
| 336 | | B13.B1.B10 | uṭaṇ, valaṇ | 945 | with, consent, immediately | உடன், வலண் |
| 337 | | (B13.B1.B10).B5 | uṭai | 593 | wealthy | உடை |
| 342 | | B13.B2 | ūr (ural, uṛi) | 752 (651, 708) | town, village | ஊர் (உரல், உறி) |
| 347 | | B9.B13 | vēlūr | - | hunter's town | வேலூர் |
| 358 | | B38b.B13 | cevūr | - | bronze worker's town | செவ்வூர் |
| 344 | | (B13.B2).B2 | ūr-ar | - | important | ஊரார் |

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|---|-------|-----------------------|------------------------------|------------------------|---|-------------------------|
| | | | | | sign with clitics | |
| 343 | 𑌵 | (B13.B2).B1 | ūr-il | - | important sign with clitics | ஊரில் |
| 373 | ○ | B14 | pa | 3805, 4016, 4124, 3884 | sun, pot | பகல், பள்ளம், பானை, பண் |
| 375 | ① | B14.B1 | pal, pala | 3986a | teeth, many | பல், பல |
| 386 | ① | B14.B1* | poli, poḷi | 4550, 4560 | prosperous, chisel | பொலி, பொளி |
| 379 | ② | B14.B3 | pammu, pollam | 3934, 4554 | to baste, to yarn, stitch, joining | பம்மல், பொல்லம் |
| 324 | 𑌵 | (B14) ² * | pinṇu | 4207 | entwine, plait, weave | பின்னு |
| 384 | 𑌵 | B14.B1* | pallā | 3986a, 1045 | elephant | பல்லா (யானை) |
| 391 | 𑌵 | B14.B1* | pallā | 3986a, 1045 | elephant | பல்லா (யானை) |
| Depicted by the ornamental oval-shaped plate that is fixed on it's forehead | | | | | | |
| 392 | 𑌵 | B4.(B14.B2) | nal-pallar (nalla-palla-iru) | - | good mahout | நல் பல்லர் |
| 393 | 𑌵 | (B14.B2).B12 | pallar-kuṭi | 1655 | mahout hamlet | பல்லர்குடி |
| 403 | 𑌵 | B14.B2 | parai, parru | 4031, 4032, 4034 | announcement (sale) with a drum beat | பறை, பற்று |
| 407 | 𑌵 | B14.B3 | pulam, pollam, pollar | 4303, 4554 | arable land, stitching, tailor | புலம், பொல்லம், பொல்லர் |
| 406 | 𑌵 | (B14.B1) ² | paḷapaḷa | 4012 | glittering, well-oiled | பளப்பள |
| 404 | 𑌵 | B4.(B14.B2) | nal-parai | | good announcement | நல்ல பறை |
| 387 | 𑌵 | B9.B14 | vēlappa | | worker, hunter | வேலப்பன் |
| 389 | 𑌵 | B14.B3* | pañ-nilam | 3837 | ploughed land | பண்ணிலம் |
| 254 | 𑌵 | B16 | paṭi, paṭṭi | 3848, 3850, 3868 | hamlet, village, settlement, rest, roost, step gradee, rank | படி, பட்டி |

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|----------|-------|---------------|-----------------------------|-------------------------------|--|---------------------------------------|
| 216 | ☒ | B17 | ta (tandi, tondi, tavalai) | 2946, 3110, 3549 | earthen pot | தண்டி, தோண்டி, தவளை |
| 217 | ☒☒ | B17.B17 | toṭal, toṭu, toṭu | 3480, 3482 | touch, begin, join, to wear, dress-up | தொடல், தொடு |
| 53 | ☒ | B17.B10 | tāvu | 3177 | jump, luxuriant, tread gently | தாவு, தவளை |
| 222 | ☒ | B17.B1 | tal, tol | 3123, 3105, 3516 | obstruct, stop beat, crush, old, ancient | தல், தொள் |
| 223 | ☒ | (B3.B3).B17 | mumuta | 4954 | grand-parent | மும்முத |
| 229 | ☒ | B17.B12c | taṛ, tāṛi | 3178 | bow down | தாழு, தாழி |
| 36 | ☒ | B17.B8a | -tan | - | - | -தன் |
| ? | ☒ | B14.B10 | pān | 4068 | song, melody | பாண் |
| 396 | ☒ | B14.B10.B1 | pāṇal | 4071 | rice-field | பாணல் |
| 31 | ☒ | B14.B10.B8a | pāṇan | 4068 | tamil bard | பாணன், பாடுபவன் |
| 40 | ☒ | (B14.B2).B8a | paṛaiyaṇ | 4032 | drummer | பறையன் |
| 59 | ☒ | B18 | kaṇ, kanni | 1159a, 1166, 1168, 1417, 1483 | bamboo raft, trap, trapper | கண், கன்னி |
| 60 | ☒ | B4.B18 | nalla-kanni | - | good vehicle, good trapper | நல்ல கன்னி |
| 67 | ☒ | B19* | kondū, kōnda, gōnde | 2053, 2216 | bull, with | கொடு (கொண்டு), கோண்டே, கொண்டே, கொண் ட |
| 72 | ☒ | B18.B1* | kōl | 2238 | boat, raft | கோல் |
| 70 | ☒ | B18.B1 | kāl | 1483 | cart | கால் |
| 65 | ☒ | B22a.B19 | peru-kanni | | big boat, big cart | பெருங்கன்னி |
| 75 | ☒ | B22a.(B19.B5) | peru-kaṇai | 1404 | intense, abundance | பெருங்கனாய் |
| 69 | ☒ | B18.B4 | kaṇṇal | 1305, 1415 | vessel, ship | கண்ணல் |
| 66 | ☒ | B4.(B22a.B18) | nal-peru-kanni | - | great good gentleman | நல்பெருங்கன்னி |
| 58 | ☒ | B18* | muttu | 4959, 4932, 4957 | pearl, excellent, praiseworthy | முத்து |
| 78 | ☒ | B19 | pori, puri, purā, pura, pūr | 4286, 4334, 4374, 4603 | courage, pride, chicken, | புரி, பொரி, புறா, |

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|--|-------|---------------|-----------------------------|------------------------|---|---------------------------|
| | | | | | pigeon, dove, quail, pheasant | |
| 77 | 𑌕 | B19.B10 | paraṇ- | 4020 | bird farming, sustainer | பரண்- (பறந்தூர்) |
| 79 | 𑌕 | B1d.(B19.B8a) | cuṭṭi-paraṇ | 2655-4020 | crested pheasant | சுட்டி பரண்- (பறந்தூர்) |
| 80 | 𑌕 | B19.B19 | paraparaṇ | 3949 | bird farming, pigeon messenger? | பறப்பரன் |
| 81 | (𑌕) | B11b.B19 | valai-pori | - | trapping bird | வலைபொரி |
| 319 | 𑌕 | B20 | muri, muri | 4977, 5010, 5008 | twist, twine, tender leaf, shoot, sprout, break, perish | முரி, முறி |
| 134 | 𑌕 | B22a | peru, pēr | 4411 | big, large | பெரு, பேர்- |
| 204 | 𑌕 | B22b | meruku, mēruve | 5074, 5094 | shining, pyramid | மெருகு, மேரு |
| 205 | 𑌕 | B22c | nal-kompu, nāmpu | 2115, 3649 | good clever, sprout of millet | நால்கொம்பு, நாம்பு |
| 206 | 𑌕 | B3.B22b | mū-mēññal, mū-mēval | 5097, 5096 | long-lasting plough/desire | மூமேன்னல், மூமேவல் |
| 207 | 𑌕 | B4.(B3.B22b) | nal-mū-mēññal, nal-mū-mēval | 5097, 5096 | good long-lasting plough/desire | நல்மூமேன்னல், நல்மூமேவல் |
| 209 | 𑌕 | B22b*.B1 | mēval | 5096 | join, unite | மேவல் |
| 210 | 𑌕 | B22b.B1 | mēyccal | 5093 | grazing, pasture | மேய்ச்சல் |
| 261 | 𑌕 | B22d | kō | 2177, 2178 | mountain, gentry | கோ, கோட்டை |
| Origin of the word "kō" could be the Gond people (gōnde, DED 2216) of the mountains, reinforced by the West wind, from western practice of having kings in Sumeria | | | | | | |
| 30 | 𑌕 | B22d.B8a | kōvan | | herder, herdsman, gentry | கோவன் |
| Cattle class that eventually becomes the ruling gentry | | | | | | |
| 267 | 𑌕 | B22d.B22d* | kōṭṭa, kōṭu | 2207, 2053, 2203, 2200 | gift, munificence, fort, gentry (west wind, western practice of having kings) | கொட, கோட்ட, கொடு, கொம்பன் |

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|----------|------------------------|---------------|--------------------------|-----------------------|---|--------------------------|
| | | | | | in Sumeria), horn | |
| 272 | 𐎶 | B22d.B5 | kōtai, koṭai | 2207, 2049 | fort, gift | கோட்டை |
| 271 | 𐎶𐎵 | B22d.B3 | kōṭṭam | 2058 | cattle-shed | கோட்டம் |
| 277 | 𐎶𐎵𐎶 | B22d.B1 | kōṭṭāḷ | - | fort guard | கோட்டாளர் |
| 201 | 𐎶𐎵𐎶𐎵 | B22e | vāyil, vāyal, vācal | 5354 | doorway, entrance | வாயில், வாசல் |
| 244 | 𐎶𐎵𐎶𐎵𐎶 | B22f | aru, ārru, arai, araṇ | 317, 407, 322, 201 | strong, dwelling, camp, room, castle | அறு, ஆறு, அறை, அரண் |
| 242 | 𐎶𐎵𐎶𐎵𐎶𐎵 | B22g | māṭi, māḷikai, māṭam | 4796a | mansion, terrace, hall | மாடி, மாளிகை, மாடம் |
| 243 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B22g.B13 | māṭu | 4798 | ox | மாடு |
| 197 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | B22h | mē, mēṭu, mettai | 5086, 5058, 5069 | top, terrace | மேல், மெத்தை |
| 198 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B22h.B3 | mē-mū | 5086 | higher maturity | மேழு |
| 199 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | B22h.B9 | mē-vēl | 5086 | excellent hunter | மேவேல் |
| 200 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B4.B22h | nal-mēl | 5086 | good excellence | நல்மே |
| 402 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | (B10-B4).B1* | nāṭu | 3638 | country (as a contrast to forest) | நாடு |
| 245 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B23 | taṭṭi, taṭṭu, taṭṭān | 3036, 3039 | cloth, wooden frame, hammer, tap | தட்டி, தட்டு, தட்டான் |
| 246 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | B23.B1 | taṭṭiyal | 3036 | smithey | தட்டியல் |
| 296 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B11c | vaṛi | 5297 | way | வழி |
| 149 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | B11d | nālvaṛi | 5297 | cross-road | நால்வழி |
| 297 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B6.B11c | aruvaṛi | 5297 | six-way crossing | அறுவழி, ஆறுவழி |
| 135 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | B22a.B11c | peruvaṛi | 5297 | big way | பெருவழி |
| 136 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B5.B22a.B11c | aim perumvaṛi | 5297 | five big way | ஐம் பெருவழி |
| 153 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | B22a.B1 | poruḷ, poruḷi, poraḷ | 4544 | rich, wealthy, high position, handsome | பொருள், பொருளி, பொரள் |
| 155 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶 | B24 | ampi | 177 | boat, raft, ship | அம்பி |
| 156 | 𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵𐎶𐎵 | B12b.B24.B12a | iṭa-ampi | 432, 177 | furrowing | இடஅம்பி |

| M77 Sign | Glyph | Aglutination | Syllable | DED | Description | Tamil |
|----------|-------|--------------------|----------------------------------|----------------|------------------------------------|----------------------------------|
| | | | | | boat, power boat | |
| 211 | ↑ | B25 | anuppu (ampu), anpu | 329 (178), 330 | send, love | அனுப்பு, அன்பு |
| 212 | 𑌕 | B24*.B25 | mitavai-anuppu | 4841 | send boat | மிதவை அனுப்பு |
| 195 | 𑌖 | B22i.B8a | mēlan | 5086 | superior | மேலன் |
| 196 | 𑌗 | B22i.B22i.B8a | mēl-mēlan | 5086 | excellent | மேன்மேலன் |
| 213 | 𑌘 | (B25.B24)* | varu-ampi | 5270, 177 | receive boat | வரு அம்பி |
| 83 | 𑌙 | B26 | irakkam, irappu, irakkam, irappu | 501, 514 | death | இழக்கம், இழப்பு, இறக்கம், இறப்பு |
| 50 | 𑌚 | B27a | āṭu | 347, 5152 | dynamic, enjoy, play, dance, goat | ஆடு |
| 184 | 𑌛 | B27b | ampalam | 173 | village assembly | அம்பலம் |
| 124 | 𑌜 | B2b | ēr | 2815 | plough | ஏர் |
| 125 | 𑌝 | B2c | eru | 863 | full, strong | ஏறு |
| 126 | 𑌞 | B2d | cēr | 2814 | join, unite, mingle | சேர் |
| 161 | 𑌟 | B2e | vilaku | 5423 | diverge | விலகு |
| 137 | 𑌠 | B2x | cēri | 2007 | village street, assemblage, hamlet | சேரி |
| 138 | 𑌡 | B22a.B2x | perum-cēri | 2007 | big assemblage | பெரும் சேரி |
| 139 | 𑌢 | B22i.B2x | mēl-cēri | 2007 | high assemblage | மேல் சேரி |
| 140 | 𑌣 | (B4.B2).B2x | nal-iru-cēri | - | good big assemblage | நல்லிருச்சேரி |
| 141 | 𑌤 | B2x.B11e | cēri-vaṛi | - | road to assemblage | சேரிவழி |
| 142 | 𑌥 | B22i.B2x.B11e | mēl-cēri-vaṛi | - | road to high assemblage | மேல்சேரிவழி |
| 143 | 𑌦 | (B4.B2).(B2x.B11e) | nal-iru-cēri-vaṛi | - | road to good big assemblage | நல்லிருச்சேரிவழி |
| 144 | 𑌧 | B11b.B2x.B11e.B11a | iṭai-cēri-vaṛi | - | road to herder assemblage | இடைச்சேரிவழி |
| 145 | 𑌨 | (B2x.B11e).(B5.B1) | cēri-vaṛi-vanjih | - | road to assemblage resting place | சேரிவழிவஞ்சி |

| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|-------|------------------------|--|------------------------|------------------------------------|-------------------------------|
| 146 | 𑌕 | B2x.B10 | nān-cēri | - | thread maker assemblage | நாண்சேரி |
| 147 | 𑌖 | B2x.B10 | nān-cēri? | - | thread maker assemblage | நாண்சேரி? |
| 158 | 𑌗 | B2x.B1 | cēral | 2007 | assemblage | சேரல் |
| 159 | 𑌘 | B22a.(B2x.B10) | perum-cēral | 2007 | great assemblage | பெரும் சேரல் |
| 160 | 𑌙 | (B2x.B10).(B10-B4.B1*) | cēral-nāṭu | 2007 | country assembly | சேரல் நாடு |
| 47 | 𑌚 | B28 | araṇ, araṇa, araṇai | 201, 203, 204 | fortress, gift, squink | அரண், அரண, அரணை |
| 48 | 𑌛 | B4.B28 | nal-araṇ, araṇ-nal-, ara-nal- | - | good defence, good fort, good gift | நல் அரண், அரநல்-, அறநல்- |
| 48-1187 | 𑌜 | B28.B3 | aṛam | 311 | virtue, moral duty | அறம் |
| 113 | (𑌝) | B11a.(B4.B3).B11b | viḷai-ñālam | 5437, 2913 | fertile land | விளை நாலம் |
| 415 | 𑌞 | (B10.B1) ³ | mū-pala | 7- | important many | முப்பல |
| ? | 𑌟 | B4.B1 | nal-inai, nāl-inai | - | good joining, joining four | நல்லிணை, நாலிணை |
| 49 | 𑌠 | B29a | kuṛumpu, kuḷampu | 1844, 1829 | chieftain (kuṛumba tribe) | குறும்பு, குளம்பு |
| 51 | 𑌡 | B29b | māru, mārru, mārrī, māran, iruvaṛi-māran-kuṛumpu | 4834 | barter, strong leader | மாறன், இருவழி-மாறன்-குறும்பன் |
| 302 | 𑌢 | B29c | mārral, māru-koḷ | 4834 | exchange | மாற்றல், மாறுகொள் |
| 129 | 𑌣 | B29d | koḷ | 2151 | seize, acquire | கொள் |
| 130 | 𑌤 | B29d.B1 | koḷal | 2151 | exchange, buy/sell | கொள்ளல், கொள்முதல் |
| 148 | 𑌥 | B2x.(B29d.B1) | cērukoḷal | 5297, 2151 | exchange together | சேர்ந்துகொள்ளல் |
| 237 | 𑌦 | B1b | mutal | 4951 | base, foot, stump | முதல் |
| 238 | 𑌧 | B1b.B11e | mutal-vaṛi | 4951 | eminent way | முதல்வழி |
| 239 | 𑌨 | B1b.(B34.B2) | mutal-ciṛa | 4951, 2589 | first eminent | முதல் சிற |
| 304 | 𑌩 | B11c | vil, viḷ | 5422, 5421, 5432, 5433 | bow, call out, sell | வில் |
| 305 | 𑌪 | B11c.B5 | viḷai | 5437 | productive, | விளை |

| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|-------|----------------------|----------------------|--------------------|---|-------------------------------|
| | | | | | mature | |
| 127 | 𑌗 | B30 | alaku, alanku, aragu | 239, 240, 246, 255 | beak, beauty, grains of paddy | அலகு, அழகு |
| 306 | 𑌘 | B30.(B11c.B3) | araku-vilam | - | good home | அழகு கிடில்லம் |
| 307 | 𑌙 | B11c.B1 | vilampu | 5433, 5434 | proclaim openly, serve food | விளம்பு |
| 17 | 𑌚 | B1c.B8a | villavan | 5422 | archer | வில்லவன் |
| 28 | 𑌛 | (B11c.B1c).B8a | vilampan | 5434 | one who superintends the distribution | விளம்பன் |
| 310 | 𑌜 | B11c.B11c* | vila-vila | 5424 | tremble with fear | விலவில |
| 397 | 𑌝 | B10.B1 | aṇi, aṇiyal, maṇi- | 116, 4672 | jewel, pearl necklace | அணி, அணியல், மணி, முத்து மாலை |
| 398 | 𑌞 | B22a.(B10.B1) | peru-aṇi(yal) | 116 | big pearl necklace | பெரு அணி |
| 377 | 𑌟 | B4.(B10.B1).(B14.B1) | nal-aṇi-pala | - | many good pearl necklaces | நல் அணி பல |
| 233 | 𑌠 | B3b | mumalai | - | three mountain range | மும்மலை |
| 235 | 𑌡 | B3b.B9 | mumalai-vēl | - | three mountain hunter | மும்மலை வேல் |
| 180 | 𑌢 | B30 | koṭṭu, koṭṭam | 2063, 2064, 2066 | pour, sting | கொட்டு (தேன்), கொட்டம் |
| 181 | 𑌣 | B30 | koṭṭu | 2063, 2064 | pour, sting | கொட்டு |
| 169 | 𑌤 | B4*.B3 | nilam | 3676 | land, ricefield | நிலம் |
| 171 | 𑌥 | B4*.B5 | nilai | 3675 | firm, stable | நிலை |
| 173 | 𑌦 | B2.(B4*.B5) | irunilai | 3675 | very firm, stable | இருநிலை |
| 174 | 𑌧 | B2.(B4*.B3) | iru-nilam | 481, 3676 | great/vast land | இருநிலம் |
| 88 | 𑌨 | B4.B2 | nal-iru | 3610, 480 | fine life | நல்லிரு |
| 176 | 𑌩 | B5.B1 | vanjī, anjih, añcal | 5265, 56, 54 | paddy, rice, to take on shoulder, resting place | வஞ்சி, அஞ்சி, அஞ்சல் |
| 166 | 𑌪 | B9.(B5.B1) | vēl-vanjī | - | hunter's lair | வேல்வஞ்சி |



| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|-------|-----------------------|-----------------------|------------------------|--|-------------------------------|
| 167 | 𐌵 | B9.B2 | vēlir | 5545 | chief | வேளிர் |
| 168 | 𐌶 | B9.B7 | vevvēru | 5548 | several | வெவ்வேறு |
| 170 | 𐌷 | B4.(B10-B4.B1*) | nal-nātu | 3638 | good country | நல்நாடு |
| 249 | 𐌸 | B31 | māttu | 4801, 4802 | fasten, put in, fasten, hook, kindle, fire | மாட்டு |
| 253 | 𐌹 | B31.B1 | māttal | 4802 | necklace | மாட்டல் |
| 252 | 𐌺 | B31.B3 | mār̥ram (māttu + mū) | 4834 | exchange, barter | மாற்றம் |
| 182 | 𐌻 | B12a.B2, B12a.B11e.B2 | iṭaiyar, iṭa-vaṭi-er | 450 | herder, guide | இடையர், இடவழியர் |
| 178 | 𐌼 | B*.B3 | kalappai, kalam | 1304 | plough, vessel, ship | கலப்பை, கலம் |
| 323 | 𐌽 | B32* | il, ila | 494, 497 | non-existence, leaf | இல் |
| 325 | 𐌾 | B32 | ila | 497 | leaf | இல |
| 326 | 𐌿 | B32.B5 | ilai, iḷai | 497, 496, 513 | leaf, young | இலை, இலஞ்சி |
| 327 | 𐍀 | B32. B11e.B8a | iḷavaṛian, iḷaivaṛian | - | horticulturalist? | இலைவழியான் |
| 76 | 𐍁 | B38a | cē, cēval | 1931, 2818 | red, bronze, cock | சே, செம்மை, சேவல் |
| 311 | 𐍂 | B11d | yār, eṛil | 5156 | harp, music, beauty | யாழ், எழில், இசை |
| 400 | 𐍃 | B10.B1.B10 | nuṛan | 3714, 3715 | penetrate, stitch | நுழ-, நுழன், நுழம்பு, நுளம்பு |
| 219 | 𐍄 | B17.B5 | tai (ta + kaccai) | 3473 | sew, stitch | தை |
| 214 | 𐍅 | B2.B17 | irutai | 481, 3473 | strong stitch, good tailor | இருதை |
| ? | 𐍆 | B34* | cī, cīpu, cil, calli | 2599, 2622, 1577, 2382 | cleanse, wooden peg, splinter | சீ, சிப்பு, சில் |
| 240 | 𐍇 | B37 | cil | 1577 | small | சில் |
| 241 | 𐍈 | B2.B37 | ciṛa | 2589 | eminent, illustrious | சிற- |
| 381 | 𐍉 | (B37.B2).B14 | ciṛappu | 2589 | eminent, illustrious | சிறப்பு |
| 256 | 𐍊 | B1e.(B37.B2) | nērciṛa | 3772 | just and eminent | நேர்சிற |

| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|-------|---------------------------|-------------------------|---------------|---|---------------------------|
| 266 | 𑌕 | (B4.(B37.B2)).B22d | nērciṛa-kō | 2177 | just and eminent leader | நேர்சிற கோ |
| 215 | 𑌕 | B17*.B2.B18 | ciṛuta, ciṛuttai | 2590 | panther, leopard | சிறுத்த, சிறுத்தை |
| 258 | 𑌕 | B34.B2.B5 | cīrmai | 2624 | excellence, greatness | சீர்மை |
| 257 | 𑌕 | B35 | cutti, cuttiyal | 2668 | small hammer | சுத்தி, சுத்தியல் |
| 259 | 𑌕 | B35 | cutti, cuttiyal | 2668 | small hammer | சுத்தி, சுத்தியல் |
| 192 | 𑌕 | B36 | paḷḷi | 4018 | hamlet, herdsman's village | பள்ளி |
| 193 | 𑌕 | (B22a.B3).B36 | perum-puli | 4307, 4411 | big tiger | பெரும்புலி |
| 321 | 𑌕 | B10.B10 | ñāṇ | 2908 | marriage string, necklace | நாண் |
| 322 | 𑌕 | (B10) ² .B1* | nēññil | 2907 | plogh-shaft | நென்னில் |
| 367 | 𑌕 | (B10) ³ | nānan | 2908 | yarn maker | நாணன் |
| 82 | 𑌕 | B?.B15 | taṛupu | 3142, 3169 | to join together, amass (wealth) | தறுப்பு (தாரா - வாத்து) |
| 247 | 𑌕 | (B34.B1) ⁴ | ciḷ-eṇal, ciḷu-ciḷ-eṇal | 2588 | noisy, bubbly, rainy | சிள்-எணல், சிளு-சிள்-எணல் |
| 248 | 𑌕 | (B34.B1) ⁴ .B1 | ciḷ-eṇal, ciḷu-ciḷ-eṇal | 2588 | noisy, bubbly, rainy | சிள்-எணல், சிளு-சிள்-எணல் |
| 341 | 𑌕 | B13.B2 | uṛu, uru(ku) | 689, 659, 661 | harrow, ship, tender, melt (as the heart), kind, glow with love | உழு, உரு(க்கு) |
| 177 | 𑌕 | B4.B1 | nal-mutal, nalāl | - | good chief, good worker, hard worker | நல்முதல்-, நல்லாள் |
| 409 | 𑌕 | (B10) ² .B1e | nan-nil | 3588 | good standing | நன்னில் |
| 365 | 𑌕 | B2g | viri | 5411 | spread, expand, | விரி |

| M77 Sign | Glyph | Agglutination | Syllable | DED | Description | Tamil |
|----------|---|-------------------------|--------------------------------|------------|--|---------------------------------|
| | | | | | blossom | |
| 190 |  | B37a | pālaiyam | 4117 | army camp, village surrounded by hillocks | பாளையம் |
| 189 |  | B37b | toṭṭi, tōṭṭi, ṭōṭal, ṭōṭnā | 3485, 3547 | fence, rake | தொட்டி, தோட்டி, தோடல், தோர்னா |
| 191 |  | B37b.B1 | toṭṭil | 3486 | cradle | தொட்டில் |
| 202 |  | B22i | mēṭṭu, mēḍu, metta | 5058, 5069 | height, eminence, hillock, upper storey, storied house | மேட்டு, மேடு, மெத்த |
| 203 |  | B22i*.B22i | mēl-mēṭṭu, mēl-mēḍu, mēl-metta | 5058, 5069 | height, eminence, hillock, upper storey, storied house | மேல்மேட்டு, மேல்மேடு, மேல்மெத்த |
| 188 |  | B22i.B4 | mett-eṇal, mell-eṇal | 5070, 5078 | gentle, soft | பெத்தெனல் |
| 366 |  | B13.B1.B1 | utaḷ | 610 | goat | உதல் |
| 131 |  | B22i*.B41 | mēl-ala | 240 | highly active | மேல்அல, மேல்அலை |
| 132 |  | B21 | ala, alai | 240 | wave, commotion | அல, அலை |
| 133 |  | B2.B21 | iru-ala | 240 | big-wave, big-commotion | இருஅல, இருஅலை |
| 45 |  | B13.B2 (ideographic) | ūr | 749 | crawl, creep | ஊர் |
| 46 |  | B13.B2.B3 (ideographic) | urumu, urum | 718 | growl, grunt, roar, thunder | உறுமு, உறும் |

Common phrases

285 Here we list multiple logos (mostly pairs and triplets) that commonly occur together in IVC. We also list a few non-agglutinative entangled glyphs (sign-194, 372) which we try to describe them as complex mixed states.

| M77 Signs | Glyph | Syllable | DEDR | Description | Tamil |
|-----------|--|----------|------|-------------|--------------------|
| 321-336 |  | uṭaṇ-ñāṇ | 2908 | marriage | உடன் நாண் (உடன்தை) |
| | Sign-336  also has ideographic mortar & pestle marriage association as well | | | | |

| M77 Signs | Glyph | Syllable | DEDR | Description | Tamil |
|-----------------------|-------------|---|------------|--|--|
| 176-321-336 | 𐏃𐏃𐏃 | uṭaṇ-ñāṇ-anjih | 2908 | marriage hall | உடன் நாண் அஞ்சி |
| 148 | 𐏃 = 𐏃 + 𐏃 | marukoḷal, cērkoḷal | 5297, 2151 | barter, exchange, buy/sell | மாறுகொளல், சேர்ந்துகொளல் |
| 12-124 | 𐏃/ | ēr-vuṛavan | - | farmer | ஏர் உழவன் |
| 169-124 | 𐏃/ | ēr-nilam | - | farm land | ஏர் நிலம் |
| 113 | (𐏃𐏃𐏃) | viḷai-nallam | 5437-3613 | cultivable rich soil | விளை நல்லம் |
| 130-51 | 𐏃𐏃 | maru-koḷal, iruvaṛi-māran-kurumpu-koḷal | - | barter | மாற்று கொளல், இருவழி-மாறன்-குறும்பன் கொளல் |
| 402-267 | 𐏃𐏃 | koṭa-nāṭu | - | herder country | கொட நாடு |
| 402-293 | 𐏃𐏃 | valaiyan-nāṭu | - | trapper's country | வலையன் நாடு |
| 402-76 | 𐏃𐏃 | cē-nāṭu | - | red country, bronze country | சே நாடு |
| 67-65 | 𐏃𐏃 | peru-kanni-kondu | - | with big vehicle | பெருங்கன்னி கொண்டு |
| 70-67 | 𐏃𐏃 | konda-kal | - | bullock cart | கொண்டா கல், கோண்ட கல், மாட்டு வண்டி |
| 70-67-65 | 𐏃𐏃𐏃 | peru-konda-kal | - | big bullock cart | பெரு கோண்ட கல், பெரு மாட்டு வண்டி |
| 176-307-379 | 𐏃𐏃 | pammū-vilambu-anji | - | bow stringer's resting place | பம்மு வில்லம்பு அஞ்சி |
| 402-379-319 | 𐏃𐏃 | mura-pammū-nadu | - | yarn twisting country | முறபம்மு நாடு |
| 342-379-398 | 𐏃𐏃 | perum.aṇi-pammū-ūr | - | big necklace maker's town | பெரும் அணி பம்மூர் |
| 372 = 342+400+397+162 | 𐏃 = 𐏃𐏃𐏃 | vel-aṇi-nuṛan-ūr | - | town with hunters, pearl and cloth workers | வேல்திரள்நுழனூர் |
| 194 = 342+400+397+162 | 𐏃 = 𐏃 𐏃 𐏃 | mū-iru-mēl-per-ul | - | the mighty mēl-perul | மூவிரு மேல்பொருள் |
| 96-409 | 𐏃𐏃 𐏃 | nannilai (nannu- | 3588 | amiable | நன்னிலை |

| M77 Signs | Glyph | Syllable | DEDR | Description | Tamil |
|-------------|-----------------|------------------------|------------|------------------------------------|------------------|
| | | nil-ai) | | | |
| 94-409 | / 𐑖 | nanniral (nannu-niral) | 3672, 3673 | make orderly | நன்னிரல் |
| 99-350 | == 𐑖 | vellālar | 5507 | agriculturalist | வெள்ளாளர் |
| 315-108 | 𐑖 𐑖 𐑖 𐑖 𐑖 𐑖 𐑖 𐑖 | aṛu-kuṭi-ēru | | river flooding houses | ஆறு குடிஏறு |
| 87-89 | 𐑖 | mura | 5015 | custom | முற, முறை |
| 319-101 | 𐑖 𐑖 | mutal-mutal-muri | 5010 | first initial tender leaf | முதல் முதல் முறி |
| 342-403-103 | 𐑖 𐑖 𐑖 | īral-para-ūr | 553 | grief (death) messenger town | ஈறல் பறையூர் |
| 328-222 | 𐑖 𐑖 | tāḍu, tallu | 3156, 3105 | butt with horns, gore, crush, beat | தாடு, தல்லு |
| 267-243 | 𐑖 𐑖 | māṭu-kōṭṭa | - | bison fort, buffalo fort | மாட்டு கோட்ட |

Fish signs and it's varied manifestations

290 If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is “ka” and not “ma” or “mi”. We know that the fish sign is the most frequent in Indus script, so the obvious Turing’s not so enigmatic result is that the fish sign must start with “ka” and we found “kanni” is probably more feasible. However, our result “kanni” is independent of it and was inspired by M.V.Bhaskar’s interpretation (personal communication) that the “Garial” (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that “kanni” is a term used commonly in earlier times for boat or any vehicle. The analogy could be that “kanni” refering to a women carrying children or it could be that the boat itself was driven by women in those days. However, this analogy is not without it’s difficulty. The word “kaṇṇi” refered in modern Tamil to be a maiden is without any support in DED [1]. The only support comes the word “kaṇi” according to DED 1408 is “tender”, “love”, “devotion” etc., and so is “kātal” DED 1445 - “love”, “affection”, “lust” etc. From not so mystical angle it could be just derived from “kaṇ” DED 1159 “eye”, “peacock’s tail”, probably leading to a mystical euphemism. Support from another quarter is “traveling places” come from DED 1443 “kāṇ” – “to see”, DED 1161 “kaṇ” – “place”, DED 1166 “kaṇai” - “arrow”, and DED 1109 “kaṭa” - “to move”. The interpretation that it is “kaṇṇi” is reinforced by other evidences like sign-63 “kaṇṇi-pori”, where it is meant as a “snare” DED 1183+4538.

Assuming that sign-59 𐑖 is “kaṇṇi”, it could mean any of these things: vehicle, boat, cart, trap, trapper, soft, tender etc. We will show lines of text that seem to provide such evidences, but before that we decide a few variants of fish sign and phrases:

Standalone fish signs

| M77 Sign | Glyph | Syllable | DED | Description | Tamil |
|----------|-------|---------------------|------------------------|--|--|
| 59 | 𐏃 | kaṇ, kaṇṇi | 1408, 1109, 1183, 1159 | boat, bamboo raft, soft, trapping | கண், கண்ணி |
| 72 | 𐏃 | kōl | 2238 | boat, raft | கோல் |
| 70 | 𐏃 | kāl | 1483 | cart | கால் |
| 65 | 𐏃 | peru-kaṇṇi | - | big boat/vehicle, big river, chief gentleman | பெருங்கண்ணி |
| 67 | 𐏃 | kondū, kōnda, gōnde | 2053, 2216 | bull, with | கொடு (கொண்டு), கோண்டே, கொண்டே, கொண் ட |

310 Fish sign phrases

| M77 Signs | Glyph | Syllable | DED | Description | Tamil |
|-----------|-------|----------------------|----------|----------------------|--|
| 67-65 | 𐏃𐏃 | peru-kanni-kondū | - | with big vehicle | பெருங்கண்ணி கொண்டு |
| 70-67 | 𐏃𐏃 | kondā-kāl | - | bullock cart | கொண்டா கல், கொண்ட கல், மாட்டு வண்டி |
| 70-67-65 | 𐏃𐏃𐏃 | peru.kanni-kondā-kāl | - | big bullock cart | பெருகண்ணி கொண்ட கல், பெரு மாட்டு வண்டி |
| 72-67 | 𐏃𐏃 | kondā-kōl | - | bullock raft? | கொண்டா கோல் |
| 59-328 | 𐏃𐏃 | u(ka)-kanni | 559, 563 | boat rising in waves | யுக கண்ணி |

Reading lines of text with fish sign

Sample line 1 (kanni = trapper)

𐏃 𐏃 𐏃 |

mutal-vilampan-mu.malai-kanni

முதல்-விலம்பன்-மும்மலை-கண்ணி

315 Chief archer, an expert trapper of three mountains

↑ ♪ 卍

325 “vari-(n)ci (with variants *vari, *varici, *varinci) ‘rice, paddy’ DED 5265 can be reconstructed for
Proto-Peninsular Dravidian ... It is the source of the word for ‘paddy’—i.e., rice in the field or after
harvesting and threshing, either husked or unhusked, but not yet cooked—in most of the modern
Peninsular Dravidian languages. This word may be connected to the Elamite bar ‘seed’—though
there is some doubt, as the phonetic correspondences are not regular. A related form, *ari-ci/ki, with
330 variants ari, arici, akki, arki (the last two ← *ariki) DED 215”

The Indus barter exchange system

We only illustrate the key points here. The local barter happens in the undocumented unorganized
sector at the cross-roads (X), in what is termed as “cantai” (சந்தை) in modern Tamil. The exchange
is abstracted by the symbol X and the barter mediated by X (maran?), who is usually qualified by
335 great reliable ancestary (flowery self-praise by the system). The exchange is done by symbol √ (kol,
the dagger of exchange) and X (an abstraction of the cross-road, X). Most of the script pertains to
official barter transactions of Indus, which are really instructions of transporation mode and the
origin/destination. The clitics like 𑀭 (M77-99) orchestrate the sentence structure of the lines of the
seals. An highly compressed form of information exchange mechanism is enabled by the drsastic
340 use of poly-semantic logo-syllabic script with each of these logo-syllables having many semantic
possibilities with high degree of pun. This is so deeply wedded to Indus culture and mode of
exchange that the deciphering of it has taken so long. The skills of bronze-age artisans is in full
display here with those hundreds of poly-semantic logo-syllables crafted and designed with care to
work in those small spaces available in the seals. What is interesting is that the deeply mysterious
345 swastic symbol (M77-148) is now understood as the mundane:

𑀭 = X + √ = cērukoḷ = சேர்ந்துகொள்

i.e., declaration of an important exchange, which is usually followed by drum beats 𑀭. The drum
beats are also a way to invite more people to the square for exchange (at cross-roads).

Relative volume of trade

350 We consider the absolute occurance numbers in the text and also the association to the right of sign
no. 99 𑀭. If we assume that what procedes (to the right of) sign. 99 𑀭 is the sender of goods then we
get the following data:

| Glyph | Description | No. occurances | Forward transactions |
|-------|----------------------|----------------|----------------------|
| 𑀭 | Cattle | 369 | 290 |
| 𑀭 | Ivory | 182 | 82 |
| 𑀭 | Hunting and trapping | 130 | 61 |
| 𑀭 | Agriculture | 225 | 18 |
| 𑀭 | Honey | 44 | 18 |
| 𑀭 | Elephant | 15 | 10 |

| Glyph | Description | No. occurrences | Forward transactions |
|-------|-------------|-----------------|----------------------|
| | herding? | | |
| 𐏃 | Cross-road | 41 | 8 |
| 𐏄 | Tailoring | 14 | 4 |
| 𐏅 | Jewellery | 12 | 3 |

355 Among 634 occurrences in IVC text with sign no. 99, assuming that what comes to it's right is the region that is sending commodities to the other regions, we can summarize that cattle and agriculture were the dominant activities, closely followed by carpentry and elephant-based products. Hunting, honey-gathering, fishing, carpentry, weaving and stitching were the other important activities that created products participating in the organized barter system of IVC. 360 Hunting, honey-gathering, fishing, carpentry, metallurgy, weaving and stitching were the other important activities that created products participating in the organized barter system of IVC.

Class structure of IVC

It seems from the table above that the cattle herders had the dominant trade surplus and probably the agriculturists had the highest trade deficit. Sign-41 𐏃 kīrān (DED 1621) கீழான் refers to a poor person and studying his concordance we see that he is strongly associated with sign-137 𐏃 cēri (DED 207) சேரி, a place where many people assemble, associated in modern terms with the hut dwellments or slums in cities. It is quite surprising that this association has remained true for 5000 years! It is also noted that sign-41 𐏃 (kīrān) has atleast one association with all professions, except cattle herding (sign-267 𐏃). So it is clear that there is a class structure associated with IVC which puts cattle-herders (𐏃) at the top.

370 Praise heaped on the farmer

The barter system's accumualtion of wealth by the ruling elite (sign-30 𐏃 "kovan"), accumulated in store-houses (sign-267 𐏃 "koṭṭa") necessiates a rhetoric of praise on the toiling farmer (sign-12 𐏃 "vuṛavan") like:

| M77 signs | Glyphs | Syllable | Tamil | Description |
|-----------|--------|-----------------------|-----------------------|-----------------------------------|
| 12-75 | 𐏃 𐏃 | peru.mu.kanni-vuṛavan | பெரும்பூக்கன்னி உழவன் | Enormously mature and soft farmer |
| 12-2-86 | 𐏃 𐏃 𐏃 | mutal-kāvalan-vuṛavan | முதன்மை காவலன் உழவன் | First guardian farmer |
| 12-325-86 | 𐏃 𐏃 𐏃 | mutal-ilai-vuṛavan | முன்னிலை உழவன் | The foremost farmer |

- 375 Such eulogy of farmer and farming has continued even 2000 years after IVC culture in Thirukkural:
Kural 1031: Howe'er they roam, the world must follow still the plougher's team;
Kural 1032: The ploughers are the linch-pin of the world; they bear.

Frequency of adjectives of towns

| Adjectives of towns | Syllable | Frequency | ஃ* Frequency | ஂ* Frequency | Description | Tamil |
|---------------------|-------------------|-----------|-----------------|-----------------|-------------------|-------------------|
| 𑌵 | nilam | 225 | 47 | 18 | land | நிலம் |
| 𑌶 | vēl | 196 | 40 | 8 | lance | வேல் |
| 𑌷 | nal-aran | 168 | 114 | 0 | good morals | நல் அறன் |
| 𑌸 | valaiyan | 130 | 14 | 54 | trapper | வலையன் |
| 𑌹 | vēl | 117 | 112 | 0 | hunter's town | வேலூர் |
| 𑌺 | vēlan | 104 | 93 | 0 | hunter | வேலன் |
| 𑌻 | arai | 87 | 34 | 0 | godown | அறை |
| 𑌼 | nal-vaṛi | 87 | 44 | 1 | cross-road | நால்வழி |
| 𑌽 | valai | 80 | 37 | 7 | net | வலை |
| 𑌾 | vari | 35 | 32 | 0 | road | வழி |
| 𑌿 | ce | 32 | 32 | 0 | bronze town | செம்பூர் |
| 𑍀 | peru-vaṛi | 35 | 23 | 0 | big road | பெருவழியூர் |
| 𑍁 | puli | 25 | 21 | 0 | tiger country | புலி |
| 𑍂 | tatti | 134 | 70 | 6 | smithy/carpenter | தட்டி |
| 𑍃 | er | 78 | 16 | 0 | plough | ஏர் |
| 𑍄 | iru-valai | 51 | 28 | 0 | strong net | இருவலை |
| 𑍅 | tai | 129 | 40 | 9 | tailor | தை |
| 𑍆 | ilai | 32 | 18 | 0 | horticulturist | இலை |
| (𑍇) | vālai-kanni | 13 | 12 | 0 | fishing | கன்னி வலை |
| 𑍈 | nalnellal | 61 | 14 | 8 | good farmer | நல்நெல்லாளர் |
| (𑍉) | vilai-nallam | 17 | 15 | 0 | fertile rich land | விளை நல்லம் |
| 𑍊 | mēl | 56 | 14 | 2 | uptown | மேல் |
| 𑍋 | mu.iru.mēl.pēr.ul | 56 | 27 | 1 | mighty uptown | மூவிருமேல் பொருள் |

Other adjectives (praise) and their frequencies

| Adjective | Syllable | Frequency | Description | Tamil |
|-----------|-------------------|-----------|----------------------------|------------------|
| 𑌷 | nal-aran | 168 | good moral | நல் அறன் |
| 𑍋 | mu.iru.mēl.per.ul | 56 | mature-truthful-all-mighty | மூவிருமேல்பொருள் |
| 𑍌 | mutal | 143 | chief, foremost, | முதலாம், முதலவன் |
| 𑍍 | mū | 300 | mature | மூ- |

NFM font equivalent rendering:

410 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦

Trapper velappan of the triple mountain: sends by boat along the big river with care to the tiller of land

பறவைகளை வேட்டையாடும் மும்மலையார் வேலப்பன்: பெருங்கண்ணி உடன் முன்னிருந்து அம்பி (படகு) ஏர் உழும் நிலத்துக்கு)

415 The break-up steps:

𐑦𐑦𐑦: valai-puri (வலை-புரி) mu-malai-ar (மும்மலை-யார்)

𐑦: velappa (வேலப்ப)

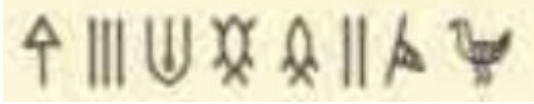
𐑦𐑦: peru-kaṇ-uṭan (பெருங்கண் உடன்)

𐑦𐑦𐑦: mu-iru (மூ-இரு)

420 𐑦: ambi (அம்பி)

𐑦𐑦: ēr-nilam (ஏர் நிலம்)

2. M77 Line 1008-100101



425 NFM font equivalent rendering:

𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦 𐑦𐑦𐑦

Bronze countryman: sends by bullock-cart to triple mountain

சேவல் நாட்டார்: மாட்டு வண்டி உடன் மும்மலைக்கு அனுப்பு(கிறார்)

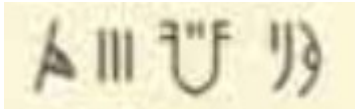
The break-up steps:

430 𐑦𐑦𐑦: cēval-naṭṭ-ar (சேவல் நாட்டார்)

𐑦𐑦𐑦: kanni-konṭa-uṭan (கன்னி கொண்ட உடன்)

𐑦𐑦𐑦: mu-anupu (மூ-அனுப்பு)

3. M77 Line 1029-100101



435 NFM font equivalent rendering:

𐎧𐏁𐎥𐎠𐎫𐎡𐏁

Hunter/trapper townsman's three-mountain country
வேட்டையாடி வலை பிடிக்கும் ஊர் மும்மலை நாடு

The break-up steps:

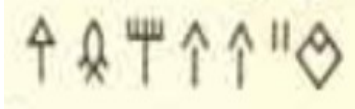
440 ॥: valai-an-in (வலையனின்)

𐤅𐤁: ur-ār (உரார்)

𑀮𑀺𑀭𑀸: mu-nāṭu (முநாடு)

4. M77 Line 1032-100101

445



NFM font equivalent rendering:

Cattle country: prized goods sent by stable boat
கோட்டுரார்: பெருமுதல் பொருள் நிலை கன்னியில் அனுப்பு(கிறார்)

450 The break-up steps:

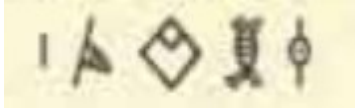
"◊: koṭ-ūr (கோட்டுரார்)

↑↑: peru.mutal-porul (பெருமுதல் பொருள்)

㊦㊧㊨: nilai-kanni-anuppu (நிலை கன்னி அனுப்பு)

5. M77 Line 1067-100101

455



NFM font equivalent rendering:

The pearl necklaces are being bartered in cattle country
அணியல் மாற்றம் கொட நாட்டில்

460 The break-up steps:

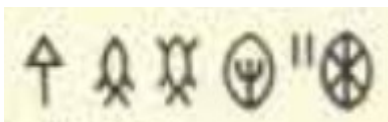
‡: aṇiyal (அணியல்)

🧬: marṛam (மாற்றம்)

📌: koda-nāṭu-il (கொடநாட்டில்)

6. M77 Line 1088-100101

465



NFM font equivalent rendering:

𑀓𑀣𑀭𑀮𑀭𑀮𑀭𑀮

Elephant country velappan: sends by bullock cart

470 பல்லார் வேலப்பன்: மாட்டு வண்டியில் அனுப்பு(கிறார்)

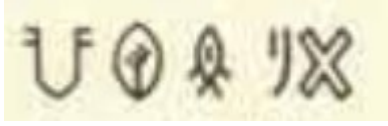
The break-up steps:

𑀮𑀭𑀮: palla-ar-velappa (பல்லார் வேலப்பன்)

𑀣𑀭: konde-kanni (கொண்டே கன்னி)

𑀓: anuppu (அனுப்பு)

475 **7. M77 Line 1095-100101**



NFM font equivalent rendering:

𑀓𑀮𑀣𑀭

Cross-roads countryman sends cart to velappa town

480 நால்வழியார் வண்டி வேலப்ப ஊர்(க்கு)

The break-up steps:

𑀭𑀮: nal-varī (நால்வழியில்)

𑀣: kāl (கால்)

𑀓𑀮: velappa-ur (வேலப்ப ஊர்)

485 **Pluripotency**

The fish sign-59 𑀣 kanni takes the values of boat, craft, vehicle, bullock cart in these cases. We have also observed that in some other case:

𑀣 𑀣𑀭 𑀣𑀭 |

that the sign-59 𑀣 kanni takes the value of “trapper” or “trapping”.

From these readings we also obtained:




ampu ≈ anuppu ≈ ambi





kondā ≈ konda





495 The syllables not only took different semantic values from the standalone values but they also took a deformed phonemic values, a key aspect of Indus writing system that enables pluripotency in both form and content in order increase coverage with only a few signs, thus increasing literacy.



500

Graphics and text: a show and tell

| M77 | Graphics | Glyphs | Syllables | Description | Tamil |
|---------------|---|--------|------------------------------------|--|---------------------------------|
| Plate V - 98 |  | 𑌕𑌃𑌕𑌃𑌕𑌃 | tāḍu/tallu- utai | butt/crush- kick | தாடு/தல்லு உதை |
| Plate V - 103 |  | 𑌕𑌃𑌕𑌃𑌕𑌃 | ceru-kottu- tālume-iru | stop-fight | செருக்கொட்டு தாளுமெ-இரு |
| Plate V - 105 |  | 𑌕𑌃𑌕𑌃𑌕𑌃 | iru-vilagu- ar-kanni- anuppu | prevent fighting by sending guard | இரு-விலக்கார்- கன்னி-அனுப்பு |

| M77 | Graphics | Glyphs | Syllables | Description | Tamil |
|----------------|---|--------|--|---|--|
| Plate VI - 114 |  | 𑌕𑌃𑌕𑌃𑌕𑌃 | mu-tāri-tai- kol-ūr-an | accept ancestral power transfer | முதாழிதை கொள் ஊரான் |
| Plate IV - 80 |  | 𑌕𑌃𑌕𑌃𑌕𑌃 | nal.vari-yar- velan-kal- aru-ūr | Controller of cross-way Velan sending boat along the river in the town | நால்வழியார் வேலன் கல் ஆற்றுருர் |
| Plate IV - 81 |  | 𑌕𑌃𑌕𑌃𑌕𑌃 | tan-tari- mu.ūr-kanni- ūr | Controller of many country transactions | தன்தாழி வேலப்ப முஞர் கன்னியூர் |
| Plate III - 55 |  | 𑌕𑌃𑌕𑌃𑌕𑌃 | palla.kotta- ar-velan- kanni- anuppu-māṭi | Unity of seven (3+2+ 2) nation's Velan (controlling bureaucrat?): Elephant fort sending by vehicle to buffalo country | பல்லர் கோட்ட வேலன் கன்னி அனுப்பு மாடி/மாடு |

| M77 | Graphics | Glyphs | Syllables | Description | Tamil |
|----------------|---|------------|---------------------------------|--|--|
| Plate III - 54 |  | 𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃 | anjih.an- ūr-ar-mēl-konda-ūr-an | Five-cross-way multi-storeyed rest-house for travellers | அஞ்சியன் ஊரார் மேல் கொண்ட ஊரான் |
| Plate III - 57 |  | 𑌕𑌃 | mu-puli(malai)-velan-eṟuvanji | Three-mountain tiger country excellent rest-house for hunters | முப்புலி வேலன் எழுவஞ்சி |
| Plate III - 50 |  | 𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃𑌕𑌃 | muvar-eṟuvanji-yar-ēr-ūr | Rhino country seal: Three-mountain rest-house to tiller's land | வலன் மூவன் வஞ்சியார்: ஏர் ஊர் |
| Plate III - 51 |  | 𑌕𑌃𑌕𑌃 | palla-ar-māṭṭu-vel-ūr | Markhor country seal: Elephant country loads to hunter's town | பல்லர் மாட்டு வேலூர் |

| M77 | Graphics | Glyphs | Syllables | Description | Tamil |
|--------------|---|----------------------------|-----------------------------------|---|--------------------------------|
| Plate I - 18 |  | புலையு | koṭa-ar-konda-para-iru-ūr | Elephant country (food): Cattle herder sending by bullock to messenger's town | கோட்டார்: கொண்ட பறையர் ஊர் |
| Line 1093 |  | புலையு புலையு புலையு | konda ūr-tarupu-ūr velūr-ūr | Gathering of buffalo townsmen at Velūr town | கொண்ட ஊர் தறுப்பூர் வேலூர் ஊர் |

505 Major countries depicted by animals in seals

This is another major category that is directly indicated by animals.

Plate III -55 [2]

510



Here we can see five major countries indicated branching from two unicorn motifs and here with two of them further branching into two subcategories.

515 The seal on the right is either calling for (or celebrating) bartering between five countries:

பு || ஐ (para-ar-ūr, பறையநூர்)

calling for five nations to join in the barter system

சுசுசுசுசு

(cērukoḷ, சேர்ந்துகொள்)

520 The animals that seem to indicate the five nations [4] in the seals are:

Markhor/Gaur (bison) ◇, Buffalo □, Elephant ⊕, Rhino ? and Tiger ✕.

Although all the skills and specialised skill centers (vanjih, 𑌕) are all distributed all over the towns and villages of all countries, in triple mountain tiger country (Afghanistan?) there seems to be preponderance of hunters, animal trappers and honey collectors.

A brief summary of the of the IVC writing system

The IVC system can be considered as a resolution of the contradiction arising between pure ideographic and pure syllabic system of writing. We were able to associate unique syllabic value to every sign. Although the ideographic system allows easy understanding of the base signs through a Dravidian root-word association, they also create a complex plethora of signs for the IVC writer to recognize and use. In order to reduce the number of signs needed, a pure syllable-based number system seems to have been used, which is affixed/prefixed/welded to the base sign to produce agglutination of word-pieces. The core consonant backbone of the base is maintained in the agglutination process, but the affixes may retain only the front/middle/tail syllable, depending on whether it is affixed/infixes/prefixed, respectively. Although each sign signifies a syllable and not a concept or idea, an ideographic undercurrent remains strong throughout the IVC writing system, creating certain stability of the semantics of the writing system. It is also observed that certain amount of arbitrariness is allowed during the agglutination process: deletion, modification or addition of vowels/glides. Glides are soft consonants that are added as binders for smooth phonetic transition between hard consonants. For proper understanding of practical Tamil grammar as it is spoken now one can consult Harold F. Schiffman [8a], but one must not apply these grammar rules blindly to the IVC writing system, as 5000 years separate the present Dravidian languages and the IVC languages.

Postposition morphemes

Harold Schiffman [8b] identified postposition morphemes in Tamil, some of which can found in this decipherment here.

| M77 Sign | Glyph | Postposition morpheme | Description | Tamil |
|----------|-----------|-----------------------|-------------|----------|
| 97 | 𑌕 | -il | in that | அதனில் |
| 96 | 𑌕𑌕 | -ai | that one | அதனை |
| 15 | 𑌕𑌕𑌕 | -ku | for that | அதற்கு |
| 336 | 𑌕𑌕𑌕𑌕 | -uṭaṇ | with that | அதனுடன் |
| ? | 𑌕𑌕𑌕𑌕𑌕 | -uḷ | inside that | அதனுள் |
| 197 | 𑌕𑌕𑌕𑌕𑌕𑌕 | -mēl | above that | அதன்மேல் |
| 296 | 𑌕𑌕𑌕𑌕𑌕𑌕𑌕 | -vaṛi | that way | அதன்வழி |
| 95 | 𑌕𑌕𑌕𑌕𑌕𑌕𑌕𑌕 | -nāl | due to that | அதனால் |
| 87 | 𑌕𑌕𑌕𑌕𑌕𑌕𑌕𑌕𑌕 | -ār | that's his | அதனார் |

| M77 Sign | Glyph | Postposition morpheme | Description | Tamil |
|----------|-------|-----------------------|-------------|--------|
| 99 | " | -ār | that's his | அதனார் |

Postposition morphemes – usage

| M77 Sign | Glyph | Postposition morpheme | Description | Tamil |
|----------|-------|-----------------------------------|--|-----------------------|
| 343 | 𑌕 | ūr-il | in that town | ஊரில் |
| 96 | 𑌕 | ūr-ār | that townsman | ஊரார் |
| 336-48 | 𑌕𑌕 | nal-araṇ-uṭaṇ | with good gift/moral, with well fortified | நல்லரனுடன் |
| 336-72 | 𑌕𑌕 | kōl-uṭaṇ | with boat | கோல்லுடன் |
| 321-336 | 𑌕𑌕 | uṭaṇ-ñāṇ (uṭaṇ as preposition) | marriage | உடன் நாண் (உடன்தை) |
| 342-197 | 𑌕𑌕 | mēl-ūr (mēl as preposition) | uptown | மேலூர் |
| 342-296 | 𑌕𑌕 | vaṛi-ūr (vaṛi as preposition) | way-by-town | வழியூர் |

Overlap with previous work

No work germinates on it's own; it usually germinates on a fertile ground laid down by others.

There were many conjectures on this Indus writing system by Asko Parbola, Iravadham Mahadevan and Brian Wells. I will briefly outline some of them pointing out overlaps and differences. It all started with the interpretation for fish sign as “mīn” by father Heras in 1930s [9]. This was reiterated with caution by Iravadham Mahadevan [10]. If we look at the frequency of the consonants in Tamil (both modern and old), the one that comes on top is “ka” and not “ma” or “mi”. We know that the fish sign is the most frequent in Indus script, so the obvious Turing's not so enigmatic result is that the fish sign must start with “ka” and we found “kanni” is probably more feasible. However, our result is independent of it and was inspired by M.V.Bhaskar's interpretation (personal communication) that the “Garial” (the river crocodile) is synonymous with fish and was probably trained and used as a boat. My own personal exposure to local customs also revealed that “kanni” is a term used commonly in earlier times for boat or any vehicle. This was probably dropped later on in Tamil literature. The same however continues in Indo-European tradition that associates feminine gender to even a modern vehicle like train inflecting verb appropriately.

There were many interpretations by Asko Parbola and Mahadevan [11] on the M77 sign-342 𑌕, including “-an”. MVB was quite critical of this being male-centric, an apt criticism, as he found no preponderance of male domination in IVC art. The interpretation of sign-1 𑌕 as “-an” has also been proposed by Bryan Wells [3] and then MVB's criticism can be cleverly overcome by stating that “-an/-al” could have been sex-neutral term in those days and associating “-al” with feminine gender

570 could have been a later invention by the male-dominant society (especially as “-al” has connotation with darkness and evil). On other proposals of Iravadham Mahadevan and Bryan Wells’s on numbers as being semantically numbers, we found no parallels in our interpretations. In fact, the numbers are probably the only signs that almost never reflected their standalone ideographic value. This was indeed quite suprising for us, as we found almost no evidence for this. MVB has been
575 quite radical in this interpretation, proposing that almost a new syllabic system can be conjured-up using just the numbers alone.

Yuri Knorozov [12] has also done extensive study of the IVC writing system and he has correctly identified numbers as syllables, with sign-86 | identified as “or”, || as “iru”, ||| as “mu”, |||| as “nal”, ||||| as “ai”. This is exactly as what we have deciphered here, although we consider sign-86 | as “mutal”
580 and not “or”.

Bryan Wells’s work also proposes other possibilities like sign-358 𑀓 being closely related to the Hare’s ears and so proposing the syllable “ce” from “cevia”. The author is in full agreement with this proposal and in fact, both this and sign-76 𑀓 also evokes the same “ce” syllables. In the IVC context of bronze-age, these have semantic connotations to “cembu” (bronze). Bryan Wells also
585 proposed “kō” for sign-261 ◇ and “kōṭa” for sign-267 ◇. We are fully in agreement with these readings.

Ansumali Mukhopadhyay [13] studied the word for teeth, “pa l la” and it’s relationship to the ivory trade. The sign-391 𑀓 is here deciphered as “pa l la”, the elephant, an important sign in the IVC, especially in relationship to the ivory trade. There could have been many more proposals that
590 may have some overlap with our interpretations here. We would be glad to include them in our document as soon as we are made aware of them.

Farmer et al. [14] criticism that the average number of signs in a line are two short (on the average of between 4 and 5 signs) for any meaningful orchestration of a writing system is quite correct. However, our decipherment points out that these lines of text are mostly **from/to** addresses with
595 mode of transport indicated through fish and arrow signs in-between the **from** and **to** addresses. Sometimes the mode of transport is left out (or is implied) and the same could be true of the **to** address, which probably is implied from the context. There are also very short lines heaping praise on towns and their workers. In any case, writing in crisp and short messages is a tradition that has continued for a long-time in Dravidian tradition, as established in Thirukkural, which is taught even
600 now in schools of Tamilnadu.

Andreas Fuls [15] has made an excellent comparative study of Linear Elamite and Indus script, showing that the Indus script is quite different from the Linear Elamite and that it is probably “logographic-syllabic writing system with many signs representing a logogram, or word root”. Our decipherment shows that this is indeed the case and that the root word or syllable are approximately
605 34 base signs from which 417 signs can be built using an aglutinative welding of bases and affixes.

Conclusions

First important study of the Dravidian family of languages was by Caldwell [16] in 1886. Recent studies indicate that the temporal origin of proto-Dravidian to be around 2500 BCE [17, 18], so it

610 can be discerned that the Indus script could have been a major epicenter for the formation of the
identity of Dravidian language family. We can even go ahead and conjecture that some aspects of
Dravidian linguistic structure could have been a result of remoulding of languages of the Indus
Valley Civilization into an agglutinative reformulation as contrained and evolved by the Indus script.
After the gradual decay of IVC, with southern migration of the population, the language could have
615 radiated into the many branches of Dravidian family [17]. A detailed study of the decipherment and
it's relationship to Dravidian morphology could provide further clarity on this feasibility.

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collected works of Yuri Knorozov [12].

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required to access the scientific veracity of the work is available through the references cited at the
end of the text and through the open web portal: <https://github.com/Sukii/decipher-ivc>. Any other
data or references cited can be provided on request.

630 Conflict of interest

Author would like to state that there is no conflict of interest in this paper.

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